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ASPECTS AND PROBLEMS OF COMPARATIVE MEDICINE.*

NEED FOR CO-OPERATION BETWEEN SPECIALISTS IN HUMAN AND ANIMAL DISEASES.

BY

J. BASIL BUXTON, M.A., M.R.C.V.S.,
Professor of Animal Pathology, University of Cambridge.

IN presenting this small and, I fear, quite inadequate contribution for discussion by the Section of Comparative Medicine I feel that I cannot do better than quote the words of the late Sir Clifford Allbutt in another place and upon a similar occasion:

"If for years slowly and almost silently our work makes its way we must be content; our experience of the world teaches us to be content; but happily, now and then, after long hewing in the dark forest we break into light, we find ourselves almost suddenly upon a peak, our way open and bright before us, and our cause justified before men. The barriers of convention, which ought to be so slender and occasional, are of all the most inveterate and impregnable. Of such have been the barriers devised by mediaeval perversities which, to its grievous injury, have split up medicine into fractions. As physic was divorced from surgery and mind from body, so the diseases of animals and plants were *separated* from those of mankind."

In that last sentence Sir Clifford put the case of what is called comparative medicine in a few words. It has become separated from the mother science, medicine. For some reason or other, but probably through ignorance of what has gone before, comparative medicine has come to be regarded by many as something in the nature of an innovation—a breaking of new ground, an inculcation of new ideas, and perhaps even the initiation of a new branch of the science of medicine. But this is not so. During the past century there has been a steady, sure progress in the study of comparative medicine in all parts of the world, but especially in tropical and subtropical countries. The reason for this is that animal diseases, particularly those caused by protozoal parasites and invisible viruses, have been recognized as a serious economic menace, and therefore more or less adequate facilities have been provided for their investigation. The general progress which has been made in comparative medicine appears to have received but little notice; indeed, it is not an uncommon experience to find the comparative aspect of the many phases of the mother science, medicine, regarded as something quite new—in fact, almost unique, or at best a more or less comprehensive recital of some of the diseases of the lower animals which may affect man also.

This misconception of the real state of affairs is probably easily explained. The encyclopaedic tradition which had persisted from Aristotle through the Arab and mediaeval schools down to Herbert Spencer has ceased to exist. It is forced upon us in our own day that in a pursuit so many-sided as medicine, whether in its scientific or in its practical aspect, we have to submit more and more to that division of labour which has been a condition of advance in all other walks of life. It is now fully recognized that that division of labour which may appear to disintegrate the mother science of medicine really unites it. While pathology, for example, which is especially the science of medicine, was winning territory on one side from physiology, of which, in a sense, it is but an aspect, and on another was making progress of its own in the *post-mortem* room and museum of morbid anatomy, and was fusing these gains in the laboratory so as to claim for itself as a special branch of science, by virtue of peculiar concepts, its due place and provision—provision in the establishment of chairs and of special laboratories for its chemical and biological subdivisions—clinical medicine was illustrating the truth of the experience that teaching and research must go hand-in-hand, the one reinforcing the other.

Unfortunately, the necessary development of specialism has led to the almost inevitable sequel—watertighting. The many children, grandchildren, and great-grandchildren of the mother science seem in their self-centred interest to forget that they are but the offspring of the parent. That branch which deals with the comparative aspect of disease has been accused of drifting farther and farther away from the parent sciences during the past century, but the fault, if fault there is, is not peculiar to that one branch of medicine. Fortunately, the current of thought is now changing, and the attitude of splendid isolation is less evident. Any attempt to prescribe a dividing line between the scientific study of the diseases of the lower animals and those of man is inevitably doomed to failure, and this fact is, fortunately, becoming better realized. Pasteur shed light upon all aspects of medicine, but above all upon comparative medicine. The stimulus provided by the master has been directly responsible for the world-wide progress which has been made during the past century. But an attitude of complacency must find no response in the hearts or minds of those who are engaged in contributing to the study of comparative medicine.

A most cursory survey of some of its many problems which have been or are in the process of being investigated cannot fail to create in the minds of those who are responsible for the prosecution of those and similar problems an overwhelming sense of responsibility in relation to the general well-being of men and animals.

The field of comparative pathology perhaps affords one of the best examples of the essential nature of the demand for close co-operation between specialists in the study of human and animal diseases. This does not for one moment suggest that the importance of such co-operation rests with a discussion of those diseases which affect both men and animals, for, however important they may be, they are relatively few in number in comparison with the diseases which are peculiar to the individual species, but which, nevertheless, have a general importance in the study of disease processes as a whole. It is true that the fact that a causal organism is common to both man and the lower animals greatly facilitates the work of the histologist, bacteriologist, immunologist, and epidemiologist. Tuberculosis probably affords one of the best examples of this, for it is only by the study of the artificially produced disease in experimental animals, and in those which acquire the disease under natural conditions, that much of our knowledge has been gained, and it is certain that any advance in the prevention or cure of tuberculosis in man will depend upon observations made in animals. Again, recent advance in the investigation of tumours has resulted from work carried out in animals in which experimental tumours can be produced, and others in which a peculiar form of tumour occurs naturally. One cannot fail to be impressed by the possibilities which might result from a systematic study and comparison of the apparently closely related neoplasms which occur in man and in various of the lower animals.

Whatever may be the outcome of the controversy concerning the etiological identity of the variolas of man and the lower animals, the fact remains that the observations of Jenner were of fundamental importance in establishing at least a cross specificity in the case of cow-pox and small-pox, and it is equally certain that any progress which may be made in the study of cultural and immune processes will depend upon investigations into the variolas of the lower animals.

Unfortunately, from the experimental point of view, it not infrequently happens that the causal organism of a disease in man is either non-pathogenic for the lower animals or produces in them lesions which do not resemble the human form of the disease. In such instances it is impossible or at least difficult to study etiological and preventive measures which might be applied to the human subject. But it is sometimes possible to find that a disease peculiar to one animal species has a very definite resemblance to a disease which is peculiar to another species—as, for example, distemper in the dog and influenza in man. A comparative study of the two diseases may reveal many common features, and knowledge gained from the study of the one may prove to be of value in the study of the other.

* Report of a discussion at a joint meeting of the Sections of Comparative Medicine and Pathology and Bacteriology at the Annual Meeting of the British Medical Association, Edinburgh, 1927. Principal O. C. Bradley presided.

As a result of investigations into a number of the diseases which are peculiar to certain of the lower animals and which are caused by invisible viruses—for example, rinderpest, foot-and-mouth disease, dog distemper, and others—several methods of inducing immunity to the disease have been devised, and it is reasonable to hope that, apart from the benefit which is likely to be conferred upon the natural host, further research may reveal the possibility of applying similar methods to diseases of a like nature which are peculiar to man.

The impetus which was given to the study of the anaerobic infection of wounds during the war has left its mark upon the bacteriology of several diseases of the lower animals, for while it was previously well known that many of the spore-bearing anaerobes which were found to play an important part in the pathological complex "gas gangrene" were commonly associated with certain well known and similar diseases in the lower animals, great progress was made in the etiological, cultural, and toxigenic properties of these organisms as soon as their significance in the military economics of the time was realized. Under normal conditions, however, they are of little importance in pathological conditions in man as compared with the lower animals, and it is certain that, while the further study of these organisms may receive but little attention at the hands of the human pathologist under peace conditions, much further light will be shed upon their relationship to pathological changes in the lower animals, and upon specific toxigenic variations in members of the same family—as, for example, has been observed in the case of *B. botulinus*.

Quite recently nutritional diseases have occupied a prominent position in comparative medicine. Contributions to the study of various aspects of organic and inorganic deficiencies under experimental conditions have done much to increase our knowledge concerning the probability of certain diseases of animals which are kept under apparently normal conditions being due, in part at least, to a deficiency of one or more of the accessory factors. One of the most important questions which have arisen as a result of purely laboratory experiments is whether, and to what extent, the results obtained with one animal are applicable to the case of other animals and to man. We know from carefully conducted experiments that deprivation of vitamin B will cause paralysis in rats as well as in fowls and in pigeons, that the elimination of vitamin C from the diet of monkeys and guinea-pigs will result in the production of the characteristic haemorrhages and bone lesions of scurvy. Similarly, in rabbits fed with such limitations, while there is an absence of haemorrhages, the characteristic pathological changes can be observed in the bony tissues. White rats, on the other hand, are little affected by the absence of vitamin C in their diet, but fail to breed satisfactorily under such conditions.

The absence of vitamin A has been shown to result in ophthalmia (first described by McCollum in rats) in poultry and in infants, in defective calcification of bone in puppies, rats, poultry, and young children. And further, the action of light in correcting a deficiency has also been demonstrated. Thus there is a schedule involving several vitamins and a series of corresponding "deficiency diseases." But there is an even more important issue represented by the widespread disturbances of a non-specific nature which are perhaps produced by vitamin deficiencies—disturbances which have a direct effect upon the severity of other diseases, especially bacterial infections. It is not an uncommon experience, when investigating widespread outbreaks of disease, especially in pigs, to find that the organism which appears to be responsible is one which, under ordinary conditions, is regarded as of little pathogenic significance, yet it appears, for some inexplicable reason, to have developed an exalted virulence. The ration usually appears to be well balanced and all that could be required, yet slight alterations in the constituents—especially in the direction of increasing the amount of vitamin C—frequently lead to a marked improvement in the general condition of the animals.

Another and equally important aspect of deficiency diseases has been investigated at the Rowatt Research Institute, Aberdeen.

Research into some problems of mineral metabolism has already been productive of information of considerable economic and scientific value. Investigations have shown that natural pastures with a low content of minerals have a low nutritive value for sheep, and that not only is the percentage of progeny from these animals low, but the mortality is often high. These and similar observations are proving of considerable importance, not only in the case of animals in this country, but particularly in some of the colonies. Of no less importance are the experiments which have been carried out to show that artificial ultra-violet irradiation is capable of increasing the absorption and retention of calcium and phosphorus in young pigs. Again, the importance of colostrum in the early life of young animals, apart from its purely medicinal effect, is well known, especially in regard to the temporary protection which it is believed to afford against bacterial invasions. It has hitherto been generally assumed that this protective power is to a large extent due to the high antibody content of the material, but it has been found that the iodine content is also very high, and in view of the claim which has been made that the feeding of potassium iodide to mares is a preventive of joint-ill in their progeny, the possibility that iodine may play an important part in the protection of the newborn animal against disease is worthy of serious attention.

Investigations into the physiology of reproduction which have been carried out at the Animal Nutrition Institute at Cambridge have added considerably to our knowledge of these normal processes, and open up a large field for investigation into the abnormal conditions which are so commonly met with in the lower animals and in the human subject.

Marshall's contribution to the study of the conditions governing parturition cannot fail to stimulate further research in this direction, especially since, as he points out, although certain factors are common, the conditions, though generally constant within a particular species, vary widely in different species, and even among closely related forms as well as in individuals.

There are, of course, many other aspects of deficiency diseases which are of great interest from the comparative point of view; these no doubt will be dealt with by others who are to take part in the discussion.

Experimental comparative physiology has not received the attention which it deserves, especially in the case of the lower animals. It has not infrequently happened that an attempt has been made to study the abnormal rather than the normal, often with results which, if capable of any sort of interpretation, have been entirely misleading. There is an enormous scope for research which will lead to a better understanding of many of the normal functions of and processes in the animal body. Such a study should progress with, and not independently of, that of the abnormal.

Another aspect of comparative medicine is that which has been termed tropical veterinary medicine. Here, again, the relationship between the diseases of man and of the lower animals is of the most intimate character. We may take as a fair example of this those which have been grouped under the heading of trypanosomiases. The classification of the causal parasites is now recognized to be far more difficult than was originally supposed. The morphological and biological characters are in themselves insufficient for this purpose, whereas the mode of development in the fly is of fundamental significance. As a result of more recent work, it has been found to be necessary to recognize different strains of the same species of organism, but the process of evolution of such strains yet remains to be determined, as also do the changes in virulence and in morphology which result from passage. There is also a call for improvement in the methods of diagnosis of infection with the various species of trypanosome. Watson showed the value of the complement fixation test in the diagnosis of dourine, while E. M. Robinson in South Africa has confirmed this, and in addition has shown that animals infected with *T. brucei* react to the test when *T. equiperdum* antigen is employed; while the serum of those affected with *T. congolense* or *T. vivax* does not usually react in the presence of that antigen, but the former may do so with the specific antigen. The many

chemotherapeutic problems relating to these diseases which yet remain to be solved can only be satisfactorily carried out in animals, and preferably in those which are naturally the subjects of the disease.

It would not be possible to close even such a sketchy and incomplete contribution as this undoubtedly is without some reference to the vast field of experimental comparative medicine represented by artificially acquired immunity. Since the time of Pasteur it has been recognized that experimentation with animals offers the only satisfactory method of determining the relative merits and demerits of the various methods of inducing a state of specific resistance to disease, not only on account of the relatively small value of the subject, but because large numbers of animals can be employed for the purpose, and, moreover, they can be maintained under natural conditions. Observations upon active immunization of horses against tetanus by means of toxin-antitoxin mixtures rendered a similar procedure possible in soldiers during the great war. Parallel experiments which have since been carried out with the modified toxins of other spore-bearing anaerobes have enabled us to confer an active immunity against a variety of diseases of sheep. The use of bacterial suspensions, consisting of living virulent or avirulent organisms, or of those which have been killed by a variety of means, has enabled us to control a number of serious epizootic and enzootic diseases of the lower animals. Experimentation along these lines is constantly progressing, and cannot fail to be of economic importance from the agricultural point of view as well as from that of mankind.

For an opening address on the subject of some aspects and problems of comparative medicine I realize that my remarks may be considered too narrow in their scope. But the aspects and the problems are so many, while the range of each is so extensive, that it is impossible in the present circumstances to do more than mention a few, and that in a very cursory manner. Those who are to follow me will no doubt make good the deficiencies which are so very obvious in my remarks.

Discussion.

Dr. Andrew Balfour (London) thought that one aspect of comparative medicine which would appeal to all was the essential unity of human and veterinary medicine; one problem well worthy of discussion was how this unity might, at least in some degree, be realized. This was probably better exemplified in the field of tropical medicine than elsewhere. As comparatively recent examples he cited Pfeiffer's work on rabbit coccidiosis and its relation to human malaria, and Theobald Smith's work on the tick in Texas fever; since those days human and veterinary medicine had advanced hand-in-hand in the tropics. He recalled Sir Patrick Manson's announcement about Ross's work twenty-nine years previously: his talk was largely about sparrows, crows, and mosquitos. After referring to trypanosomiasis, leishmaniasis, myiasis, ankylostomiasis, rabies, and bubonic plague, he passed to the consideration of the experimental method, and the necessity of enlisting the aid of the veterinarian when employing animals in medical research. He maintained that no laboratory engaged in work on tropical medicine was properly and fully equipped unless veterinary medicine was represented, and he mentioned in this connexion the system in operation at the London School of Hygiene and Tropical Medicine, with special reference to the value of its association with the Zoological Gardens. He regretted the tendency to cleavage in tropical medicine, and pleaded for combination under a research roof, while routine and clinical work could be carried out in laboratories attached to the respective hospitals. He hoped that the new Research Committee of the Colonial Office would accomplish something in this direction.

Dr. W. H. Andrews (Ministry of Agriculture) remarked that the problem of the filterable viruses furnished an excellent example of the essential unity of pathology and of medicine on the scientific side, although in the practical applications there were fundamental differences. The filterable viruses and the diseases they caused were now attracting much attention in medical and veterinary circles in both temperate and tropical regions. They constituted the most urgent problem of the present day, and the slow progress in their study suggested that new conceptions and a new technique were needed. Veterinary pathology had already furnished much that was valuable for the human pathologist, but more could be expected from research work organized on less restricted lines than in the past. The veterinary pathologist should have the great advantage of working with experimental animals of the species naturally affected by a disease, but this advantage had usually been sacrificed to financial considerations. It was known how narrowly specific might be the relations between host and parasite, and it should be recognized that guinea-pig and rabbit studies, however convenient and valuable (as long as their limitations were realized), could be entirely misleading when applied to animals of other species. Moreover, the reaction to a poisonous substance could also be narrowly specific; for example, *Matricaria nigellaefolia*, apparently harmless to all other domestic animals, induced a fatal intoxication in bovines. Recent work on chronic plant intoxications in animals had great interest for the human pathologist, but much of it was not at all widely known. In connexion with mineral deficiencies, the outstanding work of Theiler and Green at Pretoria deserved special mention. They had succeeded in establishing the etiology of the bovine disease lamsiekte, but their work had had results far exceeding that of controlling lamsiekte, although that disease had formerly caused very heavy losses indeed (see Journal, September 24th, p. 559). With respect to vitamin deficiency, it seemed very doubtful whether any of the domestic herbivora, under ordinary conditions, ever suffered severely from this cause, but specific avitaminoses occurred naturally in pigs and dogs, and probably in fowls also. Dr. Andrews felt confident that, however important such work might prove later to the human pathologist, the study of the diseases of the domestic animals would be best and most successfully pursued for its own sake, although human and veterinary pathologists should naturally co-operate and exchange information as freely as possible.

Mr. G. W. Dunkin, M.R.C.V.S. (Mill Hill), stated that the vast fields awaiting investigation and the numerous diseases common to man and the lower animals lent ample support to the suggestion of closer and more intimate co-operation between human and veterinary medicine. The Section of Comparative Medicine of the Royal Society of Medicine was flourishing, its membership was still increasing, and its meetings continued to be of the greatest interest to both branches of medicine. Nevertheless, the facilities already existing for co-operation between the two branches were inadequate for the necessary development of this team work. He stated that, with Dr. Laidlaw, he had been engaged for the past four years in the investigation of dog distemper. Although this disease was specific for the dog and ferret and did not affect human beings, there were, nevertheless, many phases which closely resembled other conditions in man, and it was hoped that the results of this research would tend to the better understanding of certain human ailments. Another disease (Johne's disease of cattle) which was receiving his attention did not, so far as he knew, possess any analogy in human medicine, but it was evident that the results would not be without interest to human bacteriologists and pathologists. It was good to know that diseases of lower animals and their investigation could be of assistance in this way, but he submitted that they were matters for team work, in order that a better understanding of the baffling pathological conditions could be obtained.

Mr. James McAllan, M.R.C.V.S. (Aberdeen), suggested that the public health aspect of comparative medicine was by no means the least important, and he emphasized the necessity for a very close co-operation between the two professions. In the field of meat inspection, while the medical officer of health would always have the last word on the fitness or unfitness of meat for human food, it seemed necessary that the veterinary surgeon should co-operate, since he had the better knowledge of animals in health and disease. In Scotland this co-operation had

been fully established. In the production of milk from the hygienic standpoint the veterinary surgeon had a big field, which was further extended by the control of milk-spread tuberculosis. From personal experience the speaker could emphasize the value of co-operation between the two professions in the investigation of food poisoning outbreaks spread by milk. On two occasions he had been able to trace milk-borne outbreaks of food poisoning to the infection of cows with Gaertner's bacillus. It was on such occasions that he appreciated clearly the value which would accrue to medical practitioners from making full use of the veterinary surgeons on the public health staff.

Professor D. C. Matheson, F.R.C.V.S. (Edinburgh), said that for the past fourteen years he had acted as veterinary pathologist to the Scottish Zoological Society. As a matter of routine every herbivorous animal was examined microscopically for anthrax before the necropsy, while in the case of carnivores the possibility of glanders had always to be considered. These animals frequently suffered from "menagerie pneumonia," and cultures from the lesions on potato often yielded an early growth of *B. coli* with a superficial resemblance to the glanders bacillus. A recent survey of the records showed that among the animals, excluding birds, tuberculosis occurred in 4.7 per cent.; in birds the incidence was 7.1 per cent. Among domestic fowls examined in the laboratory for the same period the incidence was 10.3 per cent. Impaction of the intestine by vegetable fibre, twisted by the peristaltic movements into a veritable rope, was not uncommon among the larger cursorial birds such as the rhea. Impaction of some portion of the intestine, usually with vegetable fibre, was responsible for death in 10.1 per cent. of the fowls examined during a period of thirteen years. Neoplasms were rare among the animals in the gardens.

Dr. J. G. Nasmyth (Edinburgh) emphasized the necessity for investigations into the origin of epidemic and epizootic diseases, and into the periodicity of epidemic diseases that were now controlled and no longer seriously menaced the health of the community. It was also desirable to know why, in the case of "carriers," the causal organism was able to lie dormant for long, and yet, when a suitable host offered, assert its pathogenic power. He also emphasized the importance of co-operative and co-ordinated investigations by the biologist and the biochemist in association with the pathologist and the clinician. He believed that it would be to the benefit of comparative medicine if the Veterinary College were affiliated to the University, and the Animal Diseases Research Association were similarly linked to the Veterinary College in Edinburgh. Such affiliations he was convinced would lead to co-ordination in research, and the consequent benefit of mankind by the discovery of the fundamentally common conditions which caused human and animal diseases.

Dr. F. A. E. Crew (Edinburgh) remarked that so much stress had been laid upon the need for greater co-operation between the medical and the veterinary professions that he could not refrain from asking whether they knew of what and to whom they spoke. Co-operation in research must always be between individuals. He who sought help eagerly found it, if such help was available, in the communion of minds. Those engaged in research were conscious of shortcomings, and the true searcher after knowledge recognized no monopolies: the knowledge of one was available for all. Co-operation was not based on professional organization but on common humility, for no professional organization could override personal antagonism. Far too much was made of the distinction between the medical practitioner and the veterinarian; it was the problem and technique of investigation, and not the material, that really united men. Medicine was too disposed to content itself with study of the causes and the effects of disharmony. They ought to recognize clearly that the control of the future evolution of man and of animals lay in the hands of man himself, and that they must help to decide what man should become and how animals might evolve, setting themselves the task of guiding man and beasts in the lines of their destinies. It was for them to think of the eradication of those hindrances, and the securing of that degree of material and physical comfort which was a prerequisite of spiritual development. Their great contribution would concern the breeding of man and animals naturally highly resistant and immune to diseases which threatened their existence.

Professor E. E. Glynn (Liverpool University) believed in the advantage to human medicine of the study of comparative pathology. His own pathological museum contained many specimens of animal disease which he used in teaching medical students.

Mr. W. A. Pool, M.R.C.V.S. (Edinburgh), stated that there was obviously agreement as to the necessity of greater co-ordination between the two branches of medicine. Investigation of factors concerning animals, both in health and in disease, had in the past been almost limited to consideration of those which were of immediate economic importance or of use in throwing light on problems affecting mankind. As a result they lacked essential knowledge of many things which should at the present day be well understood. Outstanding examples could be quoted in the field of physiology, such as digestion in ruminants and ungulates, and also in connexion with pharmacology, as, for example, the action of certain alkaloids on the autonomic nervous system of equines. This was due to research into animal problems being limited to those of urgency and by methods of applied science; there had not been enough investigation for the sheer desire for knowledge. Prominent examples of problems in which greater co-ordination of the two branches of medicine was necessary were the study of the streptococci of the bovine udder and the effect of nutrition on resistance to disease. The policy adopted in distributing public funds to finance investigations into problems of animal disease tended to foster this policy of attending only to questions of immediate practical importance. Subsidized laboratories were expected to justify their existence in the eyes of the public as they proceeded. This entailed the early and frequent issue of reports, and, to ensure the certainty of having something to report, investigators felt bound to limit their sphere of actions largely to problems which, while being of immediate practical importance, were also likely to produce definite results.

Lieut.-Colonel E. D. W. Greig (Edinburgh) strongly favoured close co-operation between medical and veterinary pathologists. From his experiences in the East, he gave several instances of the importance of this combination, including the investigation and treatment of rabies and the study of tuberculosis in India. He was convinced that the recent appointment by the Colonial Office of a Medical Research Committee would help materially in co-ordinating research in the two branches overseas.

Dr. T. W. M. Cameron (London) drew attention to the fact that no one had yet attempted to formulate a definition of "comparative medicine." There was a tendency to regard it as veterinary medicine, or, more frequently, as veterinary diseases in relation to man. He thought that it was neither of these. Defining medicine as the arts and sciences of preventing or removing disease, then comparative medicine was the comparison of the arts and sciences of medicine as relating to man, the domestic animals, the non-domestic animals, and even plants. Of these, probably the most important was comparative pathology. If physiology were regarded as a study of the normal reactions of an organism to normal stimuli, then pathology was, for the most part, the study of the normal reactions to abnormal stimuli; neoplasms and similar conditions of unknown etiology might well prove to be abnormal reactions to either normal or abnormal stimuli. Comparative pathology, then, would be the comparison of the host reactions of various hosts to the same abnormal stimulus. Its aim would be to elucidate the fundamental laws underlying the methods by which the body became diseased and by which it fought against disease. Thus, while including both human and veterinary pathology, it was coextensive with neither. It was, moreover, different from bacteriology or parasitology, sciences concerned with causes only, while pathology was concerned with effects.

The speaker then illustrated this concept of comparative pathology by describing the reactions of a variety of hosts to the tubercle bacillus and to the hydatid cyst. Comparative pathology was a natural sequel to comparative physiology, and was a subject as capable of standing by itself in the university curriculum as any of the other divisions of science. If comparative pathology and the other ancillary medical sciences were regarded in this way, then obviously "comparative medicine" should really be called "medicine," and what was generally regarded as "medicine" should be rechristened "human medicine." Man was only the most domesticated of the mammals, and in these neo-Darwinian days there was no reason why an unqualified name should be given to the purely human sciences, while grouping those concerned with the other domestic animals under the cumbersome title of "veterinary medicine." He could not accept the statement that human medicine was the mother of veterinary medicine; she was merely the elder sister who for so many years had acted as foster mother. The true parent was only now being recognized as comparative medicine, and it was to her that both the sisters, the elder as well as the younger, must look for the fundamental principles which were necessary before any real understanding of disease was possible.

TREATMENT OF TOXIC GOITRE.

I.—THE PLACE OF SURGERY IN THE TREATMENT OF TOXIC GOITRE.*

BY

T. P. DUNHILL, C.M.G., M.D.,
Assistant Director of Surgery, St. Bartholomew's Hospital.

I HAVE chosen the term "toxic goitre" because I believed it would be the wish of this meeting to discuss the treatment of the types of goitre which cause ill-health through disordered secretion.

Clinical Terms.—There will not be universal agreement on terms. That is because, although most goitres fall into well recognized clinical types, many minor differences occur. Any two types are linked up by intermediate cases.

Pathologically also many cases fall into definite groups, but practically every type of histopathological condition may be found somewhere in a diseased thyroid gland. There is a tendency to multiply types and subdivisions, but I have come to feel that the different types are related; I believe pathological evidence is tending to bear this out, and that it will ultimately be found that the differences are only in degree. Take exophthalmic goitre, with which, in its orthodox manifestations, we are familiar. Clinically we recognize a primary and a secondary type of this, but we may not be able to define where the primary type ends and the secondary type begins. Histopathologically also we recognize a primary and a secondary type, but some cases which histopathologically are undoubtedly secondary would clinically have been considered primary. There may be great differences between examples of the secondary type, and some of them approach very closely to what we are in the habit of calling toxic adenoma.

As we examine the symptoms we see progressive differences which conform to the differing appearances in the gland. A case of primary Graves's disease has well defined features; an early secondary case is scarcely distinguishable from it. In the late secondary case exophthalmos has become less and may scarcely exist, the nervous phenomena are less obvious, but the cardiac changes are more manifest, auricular fibrillation occurring frequently. Working backwards from the other end of the chain, a toxic adenoma is well recognized, but sometimes there is more than one adenoma, and, farther still, a gland may be bilaterally symmetrical, the nodules in it scarcely recognizable as adenomata, capable of being shelled out (as is a single adenoma), the whole gland approaching the type of late secondary exophthalmic goitre.

Etiological Factors.—What are the etiological factors which cause these differing appearances? Why does the gland of a primary type appear to be a solid cellular organ? and why does the gland of an early secondary type often look like a simple colloid goitre, and a late secondary look like an old fibrotic goitre with some adenomatous masses in it? We presume that a thyroid gland is normal until puberty approaches. We can agree that there is at that time of life a tremendous but quite normal call on the gland, for we believe that the thyroid secretion determines the energy output of every cell in the body. This extra demand is successfully met in the majority of people, but in order to meet it there is some temporary hypertrophy—possibly not enough to be noticed, possibly just noticeable, and, if so, rightly called a physiological hypertrophy. Involution should occur after the demand is successfully met, but if the demand is not successfully met involution does not occur, and a colloid goitre remains. These processes occur in meeting a physiological stimulus.

Now let us take notice of a pathological stimulus. We need to keep in mind two hypotheses: first, that the stimulus which causes exophthalmic goitre is situated without the gland, and secondly, that this stimulus induces changes in the gland, which in turn cause the manifestations which we recognize as the signs and symptoms of the disease. Some may not agree with this statement; if so, the argument must come later. The stimuli which induce these changes may be active from beginning to end of the disease. There is a time early in the disease when these stimuli urge the gland intensely, and there comes a time when they lessen in their intensity, but when the results induced by them in the thyroid gland dominate the clinical picture. This has to be borne in mind in deciding the treatment to be followed at the different stages of the disease. Possibly the stimulus is a subconscious sex disturbance; possibly some psychic trauma; possibly focal sepsis is added; and possibly there is deficiency of available iodine. If that pathological stimulus is directed on to a normal gland the whole gland is able to respond; it changes into a solid cellular organ—the gland of a primary exophthalmic goitre—and we have the signs and symptoms of a primary exophthalmic goitre. If that pathological stimulus is directed on to a gland in which post-puberty involution has not occurred—in other words, on to an early colloid goitre—the whole gland cannot respond, cannot change into a solid cellular organ, for most of it already consists of enlarged colloid vesicles, and the only parts of it which can respond to the abnormal stimulation are the cellular areas between the vesicles. These scattered areas become solid, opaque, whitish, and similar to the whole gland in the primary exophthalmic case. Both these types are quite definitely exophthalmic goitre. Both have prominent eyes, a hot skin, tremor, a rapid pulse, and both follow a similar course. Why separate them? Only because the appearance of the gland, macroscopically as well as microscopically, is so different, and because the second type links up with the late secondary type, and may help to explain the late toxic nodular goitre.

Now take late secondary Graves's disease. In this we have a woman who has had a goitre for many years. We know from our own experiences that the colloid goitre of puberty about the third decade loses its smooth surface and becomes nodular. It is still symmetrical, but fibrous strands develop, constricting and isolating areas throughout the gland. In the woman who "has had a goitre all her life" this change has been progressing until the fifth decade. How does this condition become toxic? The same factors which affect a younger woman with a normal gland, giving her frank exophthalmic goitre, or another woman with an early colloid goitre, giving her early secondary Graves's disease, can be brought into action at any time during a woman's life, but if these factors are directed on to an old fibrotic goitre the areas in it which are able to respond are small and scattered. We cannot at this stage expect the whole gland to respond as the normal gland did which produced exophthalmic goitre, or even as the early colloid goitre responded; and so we get a

* Read in opening a discussion in the Section of Surgery at the Annual Meeting of the British Medical Association, Edinburgh, 1927.

condition with which we all are familiar—although it may be given different names by different observers—the late secondary Graves's disease. This is included by Plummer under the term "toxic adenoma." Both pathologically and clinically we find every gradation between this and exophthalmic goitre, and between it and true toxic adenoma. This pathological change may be scattered throughout the whole gland, but we may see it limited to one lobe, replacing all the normal tissue of that lobe, the other lobe remaining, as far as we can tell, normal. Again, we see occasionally one single adenoma, the removal of which frees the patient from her symptoms, and therefore we must believe that it alone was the cause of the manifestations of disease from which she suffered.

There are thus three important factors concerned in the manifestation of exophthalmic goitre, and each of these may vary within wide limits, with corresponding differences in the ultimate result to the patient.

1. The stimulus directed on to the thyroid gland.
2. The thyroid gland which in responding to the stimulus produces disordered secretion.
3. The heart muscle (leaving out of count other viscera for the moment).

I have stated what I believe this stimulus to be. It may be intense and soul-racking, or less intense but unceasing. It may be directed on to the mechanism of a thyroid gland which is normal, or which is in a condition of colloid or adenomatous enlargement with fibrosis. The response of the thyroid gland to the stimulus may result in secretion which affects a heart whose musculature is unimpaired, and therefore able to stand up to years of intoxication, or whose musculature is already affected by the wear and tear of life and on this account soon feels the effect of an added thyrotoxaemia.

The place of surgery in the treatment of toxic goitre will vary in each of the conditions which have been discussed. Some may question whether surgery has any place in treatment. Kessell, Lieb, and Hyman[1] report that with skilful neglect the prognosis is excellent. Barker[2] has stated that the course of the disease associated with diffuse hyperplasia of the whole gland—that is, primary Graves's disease—"is probably two or three years, no matter how you treat it (medically, surgically, or radiologically)." My answer to that is, that of 273 patients operated upon by me consecutively in the last few years, 107 had suffered from the disease over four years, 77 over six years, and 53 over ten years. This represents much unhappiness for patients and their relatives, and great economic loss.

One other important question is, Could the disease have been arrested earlier? My medical colleagues will bear me out that, while patients have been lying in bed in hospital wards under what we must regard as efficient treatment, most disturbing features have developed, and it has been impossible to arrest the progress of these by any means with which we are familiar. I mean by this that corneal ulceration has occurred while the patient has been at complete rest. In several patients destruction of an eye has occurred. In one patient this lit up the other symptoms, which at the moment were not progressive, to such an extent that the patient died. Glycosuria has developed in others; maniacal symptoms in others again. Loss of weight frequently occurs in patients who have been in bed for months—5 st. in one patient—and auricular fibrillation has developed in patients who were under observation.

Again, take the economic factor. For the moment we may leave out of the discussion the question as to whether, if all patients were treated under ideal conditions, the disease could be arrested or controlled. We are faced with the fact that many patients are grievously ill, and have been ill for a long time, and that in the stage in which we find them they cannot be restored to an industrial plane by medical means, using medical means in its broadest sense. For these two reasons surgery has a place in the treatment of toxic goitre, if we can show that it is able to arrest the disease and permit a patient to resume life on an industrial plane. What this place should be can only be decided for each individual, after the character of onset, the stage of the disease, the quality of the gland, the previous treatment, and the social position of the patient have been taken into consideration.

If an operation has to be performed, three important points have to be decided: (1) When should it be performed? (2) How can it be made safe? (3) How can we ensure that it will achieve the object for which it is performed?

Lack of time prevents more than a rapid answer to these three questions. Taking the first—When should operation be performed?—we need to keep the types of the disease in our minds. In a primary case operation should not be performed early. Surely some people nearly get this disease but successfully resist it. Others get it slightly and recover. Our medical colleagues pilot many of these patients back to health. Some will not be restored to health and will settle into a chronic condition. It would obviously be wrong to operate while there is a chance of recovery without operation. The thyroid gland is much too important to have a great part of it removed unless the necessity is pressing. When a patient has suffered from the disease for approximately six months the question of operation is certainly arguable, and the patient's social position looms largely among the factors upon which we must decide. A well-to-do patient may be willing to live a sheltered life and to give up many activities. The poor patient is in quite another category. She may be unmarried and dependent on her own exertions for her living. She may be married and have a husband and children dependent upon her for the maintenance of their home. Patients in this condition cannot rest indefinitely. I find that what generally happens is that they are taken into hospital for a few weeks or a few months and then discharged, perhaps a little better, but often much in the same condition as when admitted. Crises occur from time to time, and the tendency is for the patient gradually to sink to a lower plane of health. For these operation is most helpful. Even the well-to-do patient usually wearies of the limitations under which she must live and, in any circumstances, in a certain number the disease progresses, and the signs and symptoms become so aggravated that operation becomes advisable.

When auricular fibrillation has been established or congestive heart failure has occurred, the question has ceased to be arguable. Neither rest nor medical or x-ray treatment will avail to restore the patient to health. These conditions may occur either as a late result of primary Graves's disease or quite early in a case of late secondary Graves's disease, or so-called toxic adenoma. Without operation the patient is doomed to permanent invalidism; by means of operation—followed by treatment—the fibrillating heart is almost always restored to normal rhythm, and congestive heart almost always disappears. In these two types, with auricular fibrillation, there should be no delay beyond the time necessary to get the patient into the best condition for undergoing operation.

The second question is, How can operation be made safe?

1. By ensuring that the patient has no other load to carry besides the disease itself. It is surprising to what extent patients are still sent for operation with foci of gross sepsis present. The majority of patients improve obviously when septic foci are cleaned up, and in an operation where the margin of safety is narrow enough every factor which reduces this margin should be eliminated. It should not be necessary to insist on this at this late period.

2. By rest in bed. It takes several days for the pulse rate to come down to its resting level when a patient is put to bed and freed from her worries.

3. With exophthalmic goitre, by iodine medication. This should be commenced as soon as it is seen to what extent the pulse rate has dropped as the result of rest and mental relief—that is, usually about the third day. Generally iodine will not only further reduce the pulse rate, with the associated improvement in the patient's condition, but it will induce a definite change in the pathological condition of the gland which makes the operation safer.

4. By confidence between patient and surgeon. It is not enough that confidence has been established between patient and physician. On the operation morning the surgeon must come as a friend, not as a person to be feared. This is not an emergency operation.

5. By adjusting the amount done at one operation to the patient's strength. This is most important, and the surgeon must be able to gauge it. It is always tempting to continue, and get the complete job done in one operation. The patient who has been ill for a long time will often plead for it to be finished at once; and for the surgeon it is vastly easier to deal with the second lobe in a field unhampered by scar tissue. Sometimes this is possible and, if so, it is the right thing to do; but unless the surgeon can judge this, he will tell the patient in the beginning that two operations are necessary, and then do at one stage only what is within her strength. If the patient is forewarned she is not disappointed. If she is tacitly allowed to believe that one operation will cure her, and after this is done learns that another is necessary, she will be disappointed.

In dealing with patients with grossly incompetent hearts, dilated and irregular, and with oedema, safety is only attained by the closest co-operation between physician and surgeon. In this class the results obtained are surprisingly good (I will present evidence of this later), but the margin of safety is very narrow.

Anaesthesia must be considered. Chloroform is unsafe. Open ether is safe, but it is a nuisance to have a mask so close to the operation field. Gas and oxygen with a little ether, given by the endotracheal method, is safe, and interferes less with the surgeon than any other method of inhalation anaesthesia. Rectal ether is quite good. If the surgeon will take the trouble and allow the necessary time before the operation, local anaesthesia gives a comfort in working and a freedom from bleeding which are attained in no other way. Freedom from bleeding saves much time at the operation, and this saving of time, as well as the diminished loss of blood, is of importance to the patient. In cases of auricular fibrillation I believe that local anaesthesia is essential. If these precautions are taken, there are few patients who cannot be carried through operation with a reasonable degree of safety; but no consideration of urgency on the part of the patient, or convenience on the part of the surgeon, should ever tempt him to operate at a time other than that which is the optimum, taking all the factors into account.

I think this is the place to speak of the death rate, which for this operation will range within wide limits. It will vary according to the type of patients operated upon, and greatly according to the time selected for the operation in each individual, and the care with which the preliminary treatment has been carried out. Some surgeons will be careful for their statistics; others will undertake operation at some risk on patients who without operation are, so far as can be judged, doomed to complete invalidism; and it will naturally vary according to the experience of the operator. My own death rate in operations for Graves's disease—excluding toxic adenoma—is 2.8 per cent. Never neglect this when discussing the question of operation with patients.

Apart from death, two other calamities can occur as the result of operation: damage to the recurrent laryngeal nerve, and tetany. I have injured one nerve very occasionally, but I have seen two patients in whom both nerves had been irrevocably damaged. I have had one case of severe tetany.

The third question is, How can we ensure that operation will achieve the object for which it is performed?

There are many patients who have been operated upon for exophthalmic goitre who are not cured, and the reasons for this require examination. Kocher stated that removal of one lobe with the isthmus, and ligature of an artery on the other side, cured 83 per cent. of cases.[3] Similar statements were published by American surgeons. Twenty years ago I insisted that this was not so, and I have insisted continuously since. The remaining lobe is bigger than the whole normal gland, and very toxic. It is not reasonable to suppose that the patient could be cured while all this remains. This must be realized in the beginning. The removal of the first lobe is comparatively easy. Removal of the appropriate amount of the second lobe is much more difficult. The approach is through scar tissue, anatomical planes may have been destroyed by adhesions, and an extremely vascular gland must be cut through; but unless the surgeon is prepared to undertake the second operation he should never perform the first. Removal of one lobe improves a patient so much at first that patient and surgeon are pleased, but this result is so far short of a cure that, if left at that, it can only bring the operation into discredit. The pulse rate will not remain down, the eyes will not recede, and in patients with auricular fibrillation there will not be restoration to normal rhythm. To make the operation effective sufficient gland substance must be removed to eliminate the toxic effects of the secretion, always bearing in mind the physiological needs of the body.

What evidence can we produce that surgical treatment will shorten the duration of the disease, or restore to normal function organs which have shown evidence of failure? I have selected some cases to illustrate different grades of the disease and the response to operative treatment in each.

Two young women had both been ill for more than six months, but had no heart failure; one of them earned her living by working in the General Post Office, the other had difficult home duties. The first went back to her work at the post office immediately on her return from convalescent home four years ago, and has worked continuously since. She feels quite well. The second, whose exophthalmos was such that she suffered from corneal ulcers each time she was in hospital, went home to nurse an invalid father who, apart from her day work, calls her out of bed several times each night. She writes to state that she feels well, and carries out her duties without difficulty. A fireman on the northern express service went back to his duties after his return from convalescent home and has carried on continuously since.

Exophthalmos.—The question is often asked, Will the eyes improve? They will. How much we cannot say. Sometimes the return to normal is not so complete, but there is always much improvement, and this improvement increases.

Cardiac Failure.—Now we pass to patients with cardiac failure. These are the patients about whom Marion Read[4] writes: "Many had reached the stage of myocardial damage which leads to decompensation, which is the one residuum of this disease which is most distressing, and from which there is often no recovery." This statement has been much quoted. I have operated upon 63 patients with established auricular fibrillation in the last six and a half years. Some of these could only be described as waterlogged wrecks. Of them, 4 have died; 4 have, for one reason or another, only had one lobe removed and the heart beat has not regained normal rhythm; of the other 55 I believe only 2 have not regained normal rhythm. Therefore 87 per cent. of these patients have been restored to a level of health which could scarcely have been believed possible. In reference to these deaths, some of the transformations have been so remarkable that we are occasionally lured into attempting too much, but I believe that in this type of case the death rate has not been higher than has occurred in cases not operated upon. The disappearance of fibrillation is interesting in another respect. We do not yet know the origin of this disease, but the disappearance of fibrillation after operation shows that the origin of the toxins which are the ultimate cause of some of the most distressing symptoms is in the diseased thyroid gland.

Glycosuria.—In working with my medical colleagues it has become clear that with some patients who have suffered from glycosuria associated with Graves's disease it has been impossible to control the glycosuria before operation, while, after a sufficient thyroidectomy, the glycosuria has disappeared spontaneously, or has been readily controlled.

Dropsy.—The following case illustrates the increase in the amount of urine immediately following operation in a waterlogged patient in whom diuretics had been ineffective.

A woman arrived from South Africa as ill as a patient could be. Legs, thighs, and trunk were enormously increased in size—a finger would leave a pit anywhere below the level of the breasts—the abdomen and pleural cavities contained fluid; she was dyspnoeic, and the daily amount of urine passed was little over one pint; the heart had been irregular for five years. She was kept for a month while every effort was made to increase the urine, decrease the dropsy, and lessen her breathlessness. She was worse rather than better at the end of the month, and then one lobe was removed. In three days the urine output increased to 60 oz. and then to 90 oz. The oedema disappeared synchronously with this. Part of

the second lobe was removed later. She went back to South Africa by herself. She now camps out, rides on horseback, and manages her household affairs.

One further aspect remains to be spoken of—namely, *mental disorder*. This complication is not common, but, taking a large number of cases, it is not infrequent. Some patients have suddenly become maniacal and died. I have had to decide what course to follow in patients who were gradually getting worse and who were approaching, or had reached, a stage when they could not be managed in their own homes. I have never operated upon these patients without the fullest consultation, and without the relatives appreciating all that is at stake, and sometimes a patient is too ill to justify operation. It is wise to have the help of a specialist in mental disorders before a decision is arrived at. Only one of these patients has not improved; the others have, after operation, returned to their ordinary way of living. One of them has married since; and one of the worst was driving her own car around London within eight weeks of her second operation.

The degree of recovery in these cases, and in the majority of cases, appears to be very high; and yet I think we must believe that in Graves's disease the secretion is not normal secretion, and when we reduce its amount by four-fifths we are not leaving a patient with an output of secretion normal in amount and quality, and therefore the end-results are not strictly comparable with those obtained after removal of a diseased appendix.

Anorexia, with Emaciation.—Now the other side of the picture. I have had three patients who have suffered from extreme anorexia—an unusual symptom in Graves's disease—associated with great wasting. The emaciation, as you know, is frequent; the anorexia is not, and I cannot help thinking that some factor with which we are not familiar is present. Of these three, one recovered after operation, one is just about holding her own, and one died some months subsequently.

Patients who have suffered severely from exophthalmic goitre never become normal as they were before the disease occurred, but they are a great deal nearer normal than if they had not been operated upon, and almost all of them can take up their work and enjoy life in the world once more.

I would ask you to bear in mind two points. We must visualize a heart and nervous system flooded with toxic secretion, sometimes continued for years. If that toxic secretion is suddenly reduced by four-fifths, the organs quickly show relief—often, indeed, dramatically—but it is unreasonable to expect that their complete recovery (their capacity to stand up to strain) should be other than gradual, and may never be quite complete. My second point is, that as soon as a sufficient operation is performed the patient feels a different woman, and is on an up grade all the time. She is conscious of this herself, and it is obvious to her friends.

References.
[1] Kessell, Lieb, and Hyman: *Arch. Intern. Med.*, 1923, 31, 433. [2] Barker: *International Clinics*, March, 1924. [3] Kocher: *Journ. Amer. Med. Assoc.*, 1907, xlix, 1240-44. [4] Read: Ibid., 1924, lxxxiii, 1963.

II.—INDICATIONS FOR SURGICAL TREATMENT IN TOXIC GOITRE.

BY

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It is important to regard the surgical treatment of toxic goitre from three points of view. When the question of an operation is under consideration it is advisable to take the opinion of the physician, of the surgeon, and of the anaesthetist, if possible in consultation, in deciding whether medical treatment should be continued or surgical treatment be adopted forthwith. The term "toxic goitre" includes all forms of goitre which give rise to general symptoms, as distinct from those which cause only disfigurement of the neck or pressure on neighbouring structures. These general or toxic symptoms are due either to hyperthyroidism or to dysthyroidism—in other words, they are the result of the passage from the goitre into the blood either of an excessive amount of normal thyroid secretion or of an altered secretion.

As the relative importance of changes in the quantity, as compared with those in the quality, of thyroid secretion in the production of thyrotoxicosis is still open to discussion, the term "hyperthyroidism" will be used simply to indicate overactivity of thyroid secretion in whatever form it may ultimately be proved to occur.

In considering the indications for surgical treatment in this group of maladies we require some form of classification. Mr. Dunhill has given us a valuable lead in this respect from the surgical aspect. I find that rather a different arrangement is more convenient from the medical point of view, as the physician sees early and mild forms of toxic goitre, in which the question of operation does not arise. A physician is apt to feel that all cases of toxic goitre ought to be amenable to medical treatment—as, indeed, we hope in the future they will be—and so is liable to look upon the necessity for surgical treatment as a confession of failure. There are, however, certain forms and stages of toxic goitre in which an operation at present affords the only means of cure or relief of the malady.

Classification.

I find the following classification is useful for practical purposes, but it must be clearly understood that there is no sharp line dividing the different groups, as intermediate cases occur.

In the first place it is advisable to divide all forms of toxic goitre into (*a*) primary, and (*b*) secondary groups. In the primary group may be placed all cases in which the onset of the toxic symptoms either precedes or coincides with the appearance of the goitre. In the secondary group the toxic symptoms only develop after a goitre, of one kind or another, has been present for several years without causing ill health. It is in this secondary group that surgical treatment is most frequently required. There are two forms of primary toxic goitre: (1) simple hyperthyroidism (thyrotoxicosis); (2) exophthalmic goitre. There are three forms of secondary toxic goitre, which may be conveniently called: (3) simple secondary hyperthyroidism (thyrotoxicosis); (4) toxic adenoma; (5) secondary exophthalmic goitre. I shall now endeavour to describe briefly these five forms of toxic goitre, with special reference to the indications for surgical treatment in each of them. Brief details of a few cases will be given as examples.

Primary Toxic Goitre.

1. *Simple Primary Hyperthyroidism or Thyrotoxicosis.*

In this condition the thyroid gland is enlarged to a slight or moderate degree. In some rare cases the toxic symptoms precede any palpable enlargement of the gland. The pulse rate at rest is increased to 90, 100, or more, and is easily accelerated by exertion or emotion. The mind is alert, and the hands tremble when extended. The skin is warm and moist, there is loss of weight, and gastric or intestinal symptoms may be present. The basal metabolic rate may be increased by as much as 50 per cent. This form of toxic goitre corresponds to the "formes frustes" of the French writers, and may be illustrated by the following case.

Miss R., aged 26, complains of palpitation on exertion, nausea with occasional vomiting, perspiration, and nervousness. There is a uniform goitre of moderate size, but no pressure signs. Pulse 100 to 104; no cardiac murmur; fine tremors; no eye signs. Medical treatment advised.

These patients are not seriously ill; they are usually amenable to medical treatment, and so are seldom referred to a surgeon. Occasionally a patient gets progressively worse, the pulse rate increases to 120 or more, the heart enlarges and may begin to fibrillate, there is great loss of weight, and severe gastro-intestinal symptoms may supervene. In these circumstances, even when the thyroid is but slightly or not even palpably enlarged, an operation should be carried out without delay. It is not sufficiently recognized that serious thyrotoxicosis may occur, and even end fatally, while external examination fails to reveal any enlargement

of the gland, the true nature of the malady only being revealed by the microscopical examination of the gland after death.

2. *Primary Exophthalmic Goitre.*

In mild and moderately severe exophthalmic goitre medical treatment alone suffices in the majority of cases, and should be given a fair trial for at least six months before it is abandoned in favour of an operation.

In a series of cases of exophthalmic goitre of all grades of severity under my care at the Manchester Royal Infirmary a thyroidectomy was performed in one-twelfth, as medical treatment had failed. In a few cases, owing to the urgent necessity of earning a living or of removing to some remote part of the world, an immediate operation has been advised which in other circumstances would have been postponed. In some cases this course has proved successful in every way, but there is a greater risk of a death, which might have been averted if time and circumstances had allowed for prolonged medical treatment.

In a large majority of cases of Graves's disease the enlargement of the thyroid is only slight or moderate, and there are no pressure signs. In a few cases, however, the goitre is larger than usual. In these medical treatment is apt to fail, so that, even if pressure signs are entirely absent, an early and extensive thyroidectomy is advisable. In all cases in which no decided improvement has taken place during six months of medical treatment the advisability of surgical treatment should be fully considered by the physician and surgeon in co-operation. In selecting a surgeon it must be realized that special experience and dexterity are just as important in a thyroidectomy as in a prostatectomy or in any laryngeal operation.

One of the chief dangers to life in prolonged cases of exophthalmic goitre is due to the development of thyrotoxic myocarditis, so that in cases in which medical treatment fails to prevent the onset of early signs of cardiac failure an operation should not be delayed. In the past an operation has frequently been considered too hazardous an enterprise to be undertaken in these cases, but, thanks to the work of Professor Fraser and Mr. Dunhill, we now know that signs of myocardial failure, such as auricular fibrillation and oedema of the legs, are not a bar to operation, but rather an indication that it should be carried out as soon as the patient has been prepared by medical treatment, so as to minimize the risk of it as far as possible. In these, as in all forms of thyrotoxic myocarditis, it is important to realize the danger of delay, as it is not fair to the surgeon to wait until the signs of cardiac failure are advanced before asking him to see the case with a view to operation.

Briefly, the advantages of operation in primary Graves's disease are: (1) The saving of time owing to the prompt reduction of the thyrotoxicosis and immediate relief of symptoms. (2) The complete recovery in some cases and marked improvement in others. (3) The diminution of the risk of the development of chronic myocarditis.

The disadvantages are: (1) The risk to life. (2) The uncertainty of the ultimate result of the operation owing to the difficulty in determining the right amount of the gland which should be removed in each case. (3) The tendency to recurrence within a year or two, with the necessity for further medical or surgical treatment.

The following case illustrates recovery after operation.

Mrs. M., aged 27, seen February 14th, 1921. Eighteen months' duration. Physical signs: Moderate uniform goitre; pulse 150; enlarged heart; exophthalmos; tremors. As this patient was very anxious to accompany her husband, who was going to live in China at an altitude of some 7,000 feet above sea level and was about to visit relations in Minnesota, I advised her to go to the Mayo Clinic for an operation. In the following June Dr. V. C. Hunt ligatured both superior thyroid arteries. This was followed in September by a double resection of the gland with removal of the isthmus. She was able to proceed to Japan in November, and the last report received from her there stated that she was perfectly well.

The following cases illustrate the tendency to recurrence after operation.

Miss U. A., a severe case of primary exophthalmic goitre in which the symptoms had developed acutely after a trying visit to a dental surgeon. Rest and medical treatment failed to relieve her. On two occasions a partial thyroidectomy was carried out by Sir Victor Horsley with benefit, but when I saw her again after an interval of ten years the symptoms were still well marked. They then subsided under *x*-ray treatment.

Mr. F. B., aged 41. Symptoms of exophthalmic goitre first developed in 1909. In 1914 a partial thyroidectomy was performed by Mr. Kelly of Liverpool. Improvement followed, so that he was able to follow his occupation for the next ten years. When seen for the first time, in 1925, the right lobe of the thyroid was absent and the left lobe had increased in size during the previous twelve months. Pulse 140 to 160; well marked exophthalmos; tremors; pigmentation of the skin; glycosuria.

SECONDARY TOXIC GOITRE.

3. *Secondary Simple Hyperthyroidism or Thyrotoxicosis.*

In this group may be placed cases in which a simple colloid or parenchymatous goitre of several years' duration becomes toxic. This complication may arise, either gradually or rapidly, as a result of some emotional strain or for no apparent reason, long after the goitre first appeared. The symptoms are the same as in the primary form. The following are illustrative cases.

Miss P., aged 39, teacher. Duration of goitre long but uncertain, as the neck had always been "full." A definite swelling had appeared during the last month. For a year she had found her work too hard for her. She had vomited several times and had lost weight. Physical signs: Moderate uniform goitre with thrill and bruit; pulse 120; heart apex beat in left nipple line; systolic murmur at apex and over pulmonary area; slight occasional widening of palpebral fissures and pigmentation of eyelids but no exophthalmos. Medical treatment advised.

Miss R., aged 43, teacher. Seen June 1st, 1927. A goitre had been present for at least twenty-three years. She had recently lost her father, mother, and brother. Six months ago she suffered from erythema nodosum. For the last five months she had had palpitations and tremors, with sickness and diarrhoea at times. Physical signs: There is a uniform soft goitre of moderate size, the circumference of the neck being 16 in.; pulse 140; systolic blood pressure 150 mm.; diastolic blood pressure 100 mm.; tremors, moist skin, and some loss of hair; increased frequency of defaecation; menses irregular. Medical treatment advised.

In these cases medical treatment may, in the absence of urgent symptoms, be given a fair trial. The results are not so good as in primary hyperthyroidism, but the toxic symptoms may subside, although the goitre will persist even if it is reduced in size. If there are no marked results from medical treatment in three months a thyroidectomy should be advised.

4. *Toxic Adenoma.*

The term "toxic adenoma" has been used with a varying significance by different authors. Some include the group which I have just described, but it seems best to restrict the name to those cases in which a nodular goitre—that is to say, an adenomatous or adenoparenchymatous goitre, which may be cystic—has been present for some time, even many years, before the toxic symptoms appeared. The cardio-vascular symptoms are often prominent in these cases, though wasting, nervousness, tremors, and gastro-intestinal symptoms may also be severe. The following are records of cases in this group.

Miss H., aged 41; seen January 3rd, 1926. A goitre had been present for eight years. She had not been well since an attack of diphtheria, after which she lost 2 st. in weight. The right lobe of the thyroid was moderately enlarged and firm in consistence, but there were no pressure signs. Pulse 124; systolic blood pressure 105 mm.; heart apex beat in left nipple line. Nervousness and tremors were present, but there were no eye signs. Menses regular. At operation, on February 2nd, 1926, Mr. Burgess removed a large, deeply buried adenoma of the right lobe. On examination by Dr. Loveday this showed the structure of a fibro-adenomatous goitre. In some parts there was an atrophic condition, with fibrosis and haemorrhage, and in others marked adenomatous proliferation of the acini and some mucoid degeneration. Here and there an acinus was seen with columnar-cell formation. On June 15th, 1927, Dr. Leather reported that the patient was very well. When last examined, early in the year, the pulse was 70 to 80, never exceeding the latter; she was much less nervous, and there were no tremors. She had gained 2 st. in weight, and the hair had begun to grow again.

Mrs. H., aged 40; seen February 11th, 1926. There probably had been some enlargement of the thyroid gland since childhood, but during the last five years the left lobe had been definitely enlarged. For several years she had felt tired by mid-day. She had suffered from bronchitis, and had been worried by her business. Recently she had a course of treatment, during which she took one pastille of Crooke's collosol iodine 1 per cent. thrice daily, and she had three doses of *x* rays. Of late she had lost weight, the pulse frequency had increased, and tremors were present. There was a uniform goitre with a small central adenoma. There were no pressure signs or eye signs. Pulse 130 to 140, irregular, owing to auricular fibrillation; heart apex beat in left nipple line. Defaecation four or five times a day. Operation was advised after a preliminary course of digitalis. About

a fortnight later the left lobe and isthmus of the thyroid were removed by Dr. Craig of Kendal, ether being given by the rectum. The patient made an excellent recovery, and Dr. Craig recently informed me that she had gained 3 st. in weight, the pulse was regular and not more than 88 even after a hard day at business. The tremors and nervous symptoms had entirely disappeared. She still finds that she cannot hurry or climb hills without some dyspnoea, but this is the only symptom left of the severe thyrotoxic myocarditis which was present when I saw her before the operation.

In the following case medical treatment was adopted, as the patient had a young family, and did not wish to run the risk of an operation.

Mrs. X. had had a goitre for fourteen years. She complained of feeling tired at times, of loss of weight, throbbing in the neck, and of palpitation, especially during the last three months. There was a moderate uniform enlargement of both lobes of the thyroid, with a small central adenoma the size of a cherry. Pulse 120; heart apex beat in left nipple line. Tremors were present.

In cases of true toxic adenoma operative treatment is advisable as soon as the symptoms become moderately severe, as medical treatment is of little permanent value. In a few cases in which operation has been declined or postponed and medical treatment has been continued some diminution of the toxic symptoms has followed *x*-ray and medicinal treatment, although there has been no diminution in the size of the goitre; but such improvement is apt to be of short duration.

5. *Secondary Exophthalmic Goitre.*

A convenient group is formed by all the cases in which the goitre has been present for several years before the onset of Graves's disease. In order to save further subdivision these cases may be grouped together whatever the character of the pre-existing goitre. In these cases exophthalmos and the other characteristic symptoms of Graves's disease are present. Secondary exophthalmic goitre is not common in this country: in a series of 300 cases seen by me in private practice only twelve were secondary. It is not so amenable to medical treatment as the primary form of the malady. In the majority of the cases, especially when the goitre is either large or nodular, an operation should be advised as soon as the symptoms are well marked. If this cannot be carried out medical treatment must perforce be continued, but the results are disappointing and myocardial changes are only too prone to progress to complete invalidism or to a fatal termination.

Mrs. H., aged 57, first noticed that she had a goitre twenty years ago; this diminished in size after the application of iodine paint. Three years ago she began to feel tired and suffered from palpitation and insomnia. The weight decreased from 9 st. 3 lb. to 7 st. There was a cystic and adeno-parenchymatous goitre. Pulse 140, slightly irregular; blood pressure 170/60; heart apex beat heaving, external to nipple line; loud mitral systolic murmur; slight exophthalmos; tremors. A suitable case for operation.

There is one special form of goitre in which, though it is truly toxic, the symptoms are not due to hyperthyroidism. I refer to the septic goitre in which an adenoma or cyst becomes infected and gives rise to a general toxaemia. I have recorded such a case in which infection of an old cystic goitre by the colon bacillus caused an intense toxaemia, which promptly subsided when the pus and gas were removed. The treatment of these cases is purely surgical.

There is no doubt that in some cases of toxic goitre focal sepsis plays a part in starting or in aggravating the thyrotoxicosis, either by way of a subinfection or a toxaemia. In my own experience the frequency and importance of focal sepsis has not been nearly so great as has been stated by some writers. In every case, however, a careful search must be made, and if a septic focus is found it must be dealt with by surgical means appropriate to its situation.

The type of operation and the choice of the anaesthetic must, of course, be left to the discretion of the surgeon and the anaesthetist. When surgical treatment has been selected the physician wishes as much of the abnormal gland to be removed as will ensure early improvement and, if possible, cure without recurrence, enough of the gland being left to prevent the onset of post-operative myxoedema. It is thus no light task we ask the surgeon to perform, but when the ideal result is obtained we are all the more grateful for what he has done for our patient. From the medical point of view a subtotal thyroidectomy, in which seven-eighths of the goitre are removed at once, appears to be the most desirable procedure in the majority of cases. After the modern methods of preparation of the patient in which medical treatment plays such an important part, preliminary ligature of the thyroid arteries and piecemeal operations should seldom be necessary. Finally it must be remembered that, in some cases, although marked improvement follows the operation, the patient is still far from being well and may still require medical treatment for a considerable period before recovery takes place.

Discussion.

Mr. C. Thurstan Holland (Liverpool) related the case of a deeply jaundiced, wasted, vomiting woman, to whom operation had been refused by a surgeon; *x* rays cured her. He believed many patients treated by surgery could have been benefited by *x* rays. They should always be used in early cases, and in advanced cases astonishing results occurred. The mortality was *nil*. *X*-ray burns and telangiectases should never be caused. He did not think myxoedema resulted from the use of *x* rays.

Professor R. E. Kelly (Liverpool) pleaded for intratracheal anaesthesia. An *x*-ray photograph, to show the position of the trachea, was useful. Warming the ether vapour was unnecessary, though moistening was advantageous. Toxic adenomatous patients were very susceptible to morphine. Iodine should be given for one week before operation upon true exophthalmic goitre. Though the early case with symmetrical enlargement was much improved by iodine administration, the patient with adenoma and hyperthyroidism did not respond to anything like the same extent.

Dr. John Eason (Edinburgh) stressed the importance of primary exophthalmic goitre. Death, in the vast majority of cases, was remote. Early operation restored a patient to normal function and stopped the deterioration of important organs. He thought operation probably raised the general death rate; when, however, deterioration of important organs had set in, operation should be considered. He desired evidence of early operative mortality. Most young people with exophthalmic goitre adjusted themselves to ordinary life activities. He regarded the general policy of operation as wrong; to justify surgical intervention the risk of deterioration must be obvious or medical treatment be unobtainable.

Sir W. de Courcy Wheeler (Dublin) said that in estimating the effects of various treatments it was necessary to remember that the disease was one of cycles; normal improvement during one of the cycles could be hastened by *x* rays and the administration of iodine. Recurrence of crises, he believed, could only be certainly prevented by a thorough surgical operation. Of 80 patients, all of whom were definitely toxic, every one had had medical treatment, with or without *x* rays, for months or years before seeking surgical help because the cures were of a transitory nature. Iodine was very potent generally in bringing about temporary improvement. He thought that the common adenomatous goitres of women were made toxic by the administration of iodine, and the effect upon the cardiovascular system was often disastrous. The effect of iodine in true goitres was admirable and dramatic in about half the cases. In about one-third some improvement was noticed, and in the rest there was no obvious effect. He had seen a patient with Graves's disease become very much worse with iodine. The mortality of operation in early cases was almost *nil*. He employed rectal anaesthesia combined with a local anaesthetic; a few patients had local anaesthesia only.

Mr. John Morley (Manchester) said that surgery and *x* rays alone had any effect upon true primary Graves's disease; the former brought about a much more rapid improvement than *x*-ray treatment. The mortality had been lowered very much of late years, and Lugol's solution

had helped a great deal. The operation should be performed seven to fourteen days after the institution of iodine therapy; seven-eighths of the gland should be removed. Preliminary ligaturing of the arteries had not proved satisfactory, and therefore the whole operation should be performed at one sitting. *X* rays were apt to leave cardiac disturbance unaffected.

Mr. A. J. Walton (London) stated that advanced colloid goitre, if it persisted to middle life, changed to diffuse adenomatous goitre. This kind of goitre rarely gave rise to exophthalmic symptoms. True exophthalmic goitre was vascular in type in young people and nervous in type in older women about the menopause. Operation often failed to relieve this second group. He believed the medical mortality to be pretty considerable. *X* rays had no effect at all upon the disease, in his experience, though they performed wonders in carcinoma of the thyroid. He had never seen fibrosis of the thyroid after exposure to *x* rays. Lugol's solution was excellent as a preliminary drug.

Dr. L. A. Rowden (Leeds) said that in twenty years only seven cases of toxic goitre had been operated upon at Leeds; all the other cases had been referred to the radiographer, as the surgeons in this town regarded *x*-ray treatment as the method of choice. If the full effect were to be obtained by this means it was necessary to give such doses that the skin was bound to be damaged. He had had experience of 550 patients; severe cases, recent cases, cases with high basal metabolic rate, and cases with small glands did best. He strongly advocated *x*-ray treatment.

Dr. F. N. G. Starr (Toronto) said that he had consulted his records for 1926, and with his assistants he had committed during that year 253 heinous offences, according to Mr. Holland. He had given up advising *x* rays or radium treatment, which did no good in the adenomas, whether hyperplastic or simple, and was dangerous in the diffuse hyperplastic. In ten cases treated some years previously the two last patients had succumbed within a few hours after the first *x*-ray treatment. With really ill patients the cure was so long delayed that it was not worth while subjecting them to the misery of six months' to a year's treatment, when a few weeks would accomplish what *x* rays failed to do. Dr. Starr thought that the goitre problem was changing, at least on his side of the Atlantic. Twenty years ago in Toronto there were many non-toxic cases and an occasional case of Graves's disease. Now, however, the tables were turned: last year, out of 253 cases operated upon, 27 only were non-toxic, and 10 were of the diffuse colloid type with hyperplasia, or presented colloid adenoma with a small amount of diffuse hyperplasia; 52 were definite hyperplastic adenomas, while 110 were diffuse hyperplastic. Finally, 54 cases, which, so far as he knew, seemed to be local, were of the diffuse hyperplastic goitre variety, with hyperplastic adenomas as well. These last always aroused great concern, but after operation the result was spectacular, provided that judgement did not fail and an operation was performed at the psychological moment. A preliminary rest treatment in the hospital was greatly to be preferred to rest at home, because often the entire benefit was lost by the journey to the hospital. In addition, a minimum of two quarts of water, together with overfeeding and the use of Lugol's solution, hastened the improvement. Often when a patient was apprehensive, if she could be placed in a two-bed ward, or in a large ward next to a patient who was convalescing after a very serious illness, she would improve more rapidly, as the patient who was recovering talked about the great benefits obtained.

Mr. Cecil Joll (London) said there were many patients with adenomatous glands and only slight toxic symptoms, and they had been included in many statistics so that confusion had resulted. True exophthalmic goitre showed severe metabolic and nervous disturbances. Symptoms rose and fell in severity in a highly variable and apparently capricious fashion. In the toxic adenoma they were constantly progressive and involved the cardio-vascular apparatus far more than any other systems. He had never seen true exophthamos in toxic adenomatous cases. Iodine had a good effect on both groups. Surgery was indicated in most patients suffering from exophthalmic goitre, but shrewd judgement was required in deciding how much gland to remove; nine-tenths was often taken away. In toxic adenoma less need be removed. The mortality was less in toxic adenomatous cases than in exophthalmic goitre. He had traced 97 per cent. of his own cases, and in general the results were good.

Mr. Dunhill, in reply, said that surgical opinion was gradually becoming crystallized as to the place surgery should take in the treatment of toxic goitre. He did not advocate operation in early cases.

THE THERAPEUTIC USES OF CALCIUM SALTS.

I.—THE PART PLAYED BY CALCIUM IN THE LIVING ORGANISM.*

BY

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An understanding of the indications for the administration of calcium in the treatment of disease and of diseased persons is complicated by the fact that this substance is always present in the body. Further, it is present in the blood in amounts that are remarkably constant. The serum in health contains about 10 mg. per 100 c.cm. Variations of from 9 to 12 mg. have been recorded by various workers, but some investigators obtain more constant figures. A serum content so constant as this points to the presence of some mechanism that maintains a balance between absorption and elimination and deposition, which must be taken into account in rational calcium therapy. Further, this constancy in the calcium content of the serum in health suggests that it plays an important part in the life of the individual, and the relation of the body to its environment.

The source of the body calcium is the calcium in the food ingested. Only a small proportion of the ingested calcium is absorbed, most of it being passed from the body in the faeces. The greater part of the absorbed calcium is excreted back into the digestive tract and eliminated with the faeces, but a small fraction is eliminated in the urine. During childhood considerably more is absorbed than is eliminated, since much is retained for the proper construction of the bony skeleton.

Our knowledge of the functions of calcium in the living organism is vague, and probably is scanty at present. Certain facts are, however, well established. It enters into the mechanism of the clotting of blood and is essential to this mechanism. A low content of calcium in the serum is associated with a disturbance of the neuromuscular apparatus, so that the electrical excitability is increased and tetany may result.[1] [3] It appears to be essential to the proper contraction of heart muscle, since the perfused heart ceases to beat sooner if calcium salts are absent from the perfusion fluid, and beating recommences on the addition to the fluid of a soluble calcium salt.[2] It is an essential constituent of bone.

In addition to these specific functions, it plays an important part in the balance of ions in the tissues and fluids of the body. Undoubtedly this ionic balance enters into all of these functional activities that have been specified, and disturbances of this balance occur in the abnormal states in which these functions are impaired. It is probable that in many more functional derangements, not yet elucidated, calcium plays a part through upsets in this balance of the ions. A balance between calcium and magnesium ions on the one hand, and sodium and potassium ions on the other, has been demonstrated[3] in normal

* The opening paper of a discussion in the Section of Therapeutics and Pharmacology at the Annual Meeting of the British Medical Association, Edinburgh, 1927. Professor J. A. Gunn presided.

life, and this balance may be disturbed by alterations in the ionic concentrations of any of these elements. The part played by calcium in spasmophilia and tetany, and in the contraction of heart muscle, must be viewed as exercised through this balance of ions as well as by calcium specifically. For example, calcium is essential to the normal functioning of the neuro-muscular apparatus, but increased electrical excitability may be produced either by a decrease in calcium or by an increase in sodium or potassium.

A balance also exists between the basic ions, such as sodium and calcium, and the acid ions, so that an increase in the acid radicals is accompanied by an increase in basic ions, the balance, upon which the hydrogen-ion concentration depends, being kept almost constant in health. Further, calcium exists in a solid form as $Ca_3(PO_4)_2$ in bone, and a balance must exist between the Ca'' ions and the $-PO_4'''$ ions and the solubility of the $Ca_3(PO_4)_2$, so that the product of ionic concentration cannot rise above a certain level.[4] An increase in the product will cause a deposition of solid $Ca_3(PO_4)_2$, and a diminution will result in the passage of $Ca_3(PO_4)_2$ from the deposits in the bones into solution in the body fluids. An increase in the concentration of PO_4''' ions will, however, result in a diminution of Ca'' ions, the product remaining constant.

These very superficial considerations must suffice to show that disturbances in the specific functions of calcium due to insufficiency are merely symptomatic of abnormalities that may be far-reaching in their consequences and remote in their causation, while any attempt to influence the specific functions by increasing the concentration of calcium above the normal may have effects on important constituents of the body and on remote functions.

Serum Calcium.

The amount of total calcium in the serum is used as an indication of the calcium supply in the living body. All of this calcium, however, is not in the same condition of chemical combination. The quantity that is in an ionized state has been variously estimated as only 20 to 25 per cent. of the total.[5] The work of Salvesen and Linder[6] suggests that part is in combination with protein, and this part will not only be in an un-ionized form but in a non-diffusible form, and therefore not easily available for utilization by the tissues. The diffusible calcium is not easily estimated with accuracy, but from observations by many workers it would appear to constitute 50 to 60 per cent. only of the total.[7] Since this diffusible calcium is alone available for producing specific or ionic calcium effects, it is obvious that figures for the total calcium of the serum may not give a true indication of the available calcium. From the work of Vines[8] it would appear that about 4 mg. of calcium per 100 c.cm. that was in a non-diffusible form in the whole blood is converted into a diffusible form during the process of clotting. If this is confirmed the figure for the total serum calcium is still further from being a true indication of the available calcium. In considering the significance of departures from the normal values for the calcium content of the serum it is important to remember, therefore, that they may affect (*a*) the non-diffusible fraction combined with protein, (*b*) the diffusible and easily ionized fraction, or (*c*) the ionized fraction. It is possible also that even when normal values for the total calcium are obtained the available calcium may be present in deficient amounts. Until simple and accurate methods are devised for estimating the available calcium in the blood its therapeutic uses cannot be placed on a satisfactory basis.

Indications for Calcium Therapy.

Nephritis.—The total calcium of the serum is definitely reduced in severe nephritis.[6 9 10 11] In the forms with pronounced oedema there is reduction also in the serum proteins, and Salvesen and Linder suggest that the reduction in such cases affects mainly that fraction that is in combination with proteins. They showed[34] that the reduction in calcium and in proteins is not the result of simple dilution, but that there is a reduction in the total proteins of the plasma even after the disappearance of oedema. It is difficult to see how an increase in the serum calcium, if it could be brought about directly, would of itself be of benefit in this form of nephritis, but any therapeutic measures that would diminish the oedema might well be of benefit to the patient, and might at the same time increase the calcium content of the serum. Blum[12] and his co-workers have advocated the administration of calcium chloride for this purpose, and in his hands and in those of many others it has proved to be an efficient diuretic in many cases. It is certain, however, that its action is not due to a specific action of calcium and the restoration of the serum calcium to a higher level. It would appear that it acts by the change that results in the balance of ions in the body fluids. Blum maintains that by increasing the calcium ions the sodium ions are decreased, and since the retention of fluids is closely associated with the retention of sodium, the oedema is decreased. Another explanation, however, is possible. The administration of calcium chloride results in the setting free of Cl' ions, the calcium being retained in or excreted into the intestines as carbonate. The Cl' ions are thus able to cause an increased acidity, and, to correct for this, sodium is excreted as sodium chloride, accompanied by large amounts of water. This latter explanation is supported by the similar beneficial action of ammonium chloride or nitrate. It is, of course, conceivable that the administration of the calcium chloride has some effect from the calcium, as Blum maintains, in addition to its undoubted effect as an acid-forming substance. In severe cases of azotaemic nephritis the serum calcium is definitely reduced, and this is accompanied by an increase in the inorganic phosphorus of the serum. It seems probable, as de Wesselow[11] has pointed out, that the low calcium content is the result of retention of phosphates and the consequent disturbance in the ionic balance. If, as he suggests, the phosphate retention is directly responsible to some degree for the toxic state known as uraemia, there would be reason to administer calcium to lower the absorption of phosphates. As far as I am aware, no clearly beneficial results have been reported in this form of nephritis by the administration of calcium or by the adoption of any indirect method of raising the calcium content of the serum such as the administration of parathyroid extract.

Tetany.—In tetany, following the removal or severe disturbance of the parathyroid glands during the operation of thyroidectomy, the serum calcium is definitely reduced. Tetany is strictly a symptom of a more fundamental disturbance, but is a crippling condition and one dangerous to life. In post-operative tetany it is specifically due to the low calcium content of the body fluids, and can be relieved by raising the calcium content. The recent work of Collip[13] has clearly demonstrated the importance of the parathyroid glands in maintaining the calcium at its normal level in the serum, and the administration of extracts of the parathyroid glands, besides being the rational treatment in post-operative tetany, is able to raise the calcium content of the serum and relieve the tetany. There is much evidence of an indirect nature in favour of the view that parathyroid extracts raise the serum calcium by mobilizing the calcium that is stored in the bones and tissues, and that their action does not depend upon the absorption of calcium from the digestive tract. Recently Stewart and Percival[14] have reported experiments that seem to give direct proof of this. The oral administration of calcium salts in excess, however, can raise the level of calcium in the serum and may relieve tetany, and intravenous administration gives prompt but transient relief. In tetany and spasmophilia accompanying rickets the serum calcium is low. The use of parathyroid extracts in rickets is contraindicated, except as an emergency, since the increased serum calcium is obtained by the removal of calcium from the bones, which are already deficient in it. In this condition the low calcium would appear to be due to poor absorption, either because of low calcium dietary or the absence of vitamin D. The low phosphorus content of the serum which is found in rickets is probably a more important factor in the defective calcification of bone than the less constant reduction in calcium. The administration of calcium salts and cod-liver oil will suffice to raise the calcium in the serum to a normal level, but such measures as exposure of the patient, or of the patient's

food, to sunlight or ultra-violet light may be all that is necessary for the proper treatment of the rickets and the relief of the spasmophilia.

Skin Diseases.—Low values for the serum calcium have been reported in various skin diseases, such as lupus erythematosus,[15] but there is no evidence that the deficiency of calcium is of significance in the pathology of the disease, and no clear evidence that raising the calcium level influences the course of the disease.

Chronic Infections.—In many and various diseases associated with chronic infections, Grove and Vines[16] find that, although the total calcium content of the serum is within physiological limits, the amount of active or diffusible calcium is reduced. They further considered that the oral administration of parathyroid extracts and soluble calcium salts was beneficial in these conditions by raising the ratio of active to total calcium. The methods employed by them in their calcium estimations are open to criticism, and the reports of the therapeutic results in their clinical investigations are not convincing. Confirmation of their results is necessary before the scope of calcium therapy can be accepted as embracing the conditions enumerated by them.

Haemorrhage.—The administration of calcium has been advocated in many conditions in which there is no evidence of calcium deficiency. The basis for such therapies may be the attempt to obtain an exaggeration of a specific calcium effect, or to correct a disturbed ionic balance. In 1896 Wright[17] advocated the use of calcium chloride administered by the mouth to reduce the prolonged coagulation time seen in haemophilia. Even when the coagulation time is not unduly prolonged, an increased serum calcium has been shown by Matz[18] and Cantarow, Caven, and Gordon[19] to be associated with a reduction in the coagulation time. Its use has been reported in many cases in which the coagulation time is prolonged, but also in others, such as purpura and pulmonary tuberculosis, in which no such prolongation is found, but the results are very irregular, and in view of the numerous factors present in patients and the numerous therapeutic procedures that are unavoidably employed at the same time, it is difficult to accept the evidence available as proof of the value of internal calcium therapy to control bleeding. Walters[20] considers that the injections of calcium chloride in the preparation for operation of patients with jaundice has reduced the risk of bleeding. I have not yet seen the evidence on which his opinion is based, but it is obvious that careful observations on coagulation time and bleeding time would be of great value, and that there is sufficient ground for the view that there may be a scope for calcium therapy in the control of haemorrhage.

Myocardial Weakness.—In 1922 Cheinisse[21] reported that his clinical studies suggested that calcium salts by the mouth enhanced the effects of digitalis, making them more rapid in their appearance and enabling a greater beneficial effect to be obtained before the onset of toxic effects. In 1924 Billigheimer[22] found that in normal persons, and in patients with heart failure, calcium chloride intravenously had an action very similar to that of digitalis, but that it was more fleeting. He considered that it acts on vagal nerve endings and on the inhibitory centres in the heart. It had no effect on the tachycardia that results from atropine, but checked the acceleration following the injection of adrenaline. There is not at present sufficient evidence for the use of calcium in the treatment of myocardial weakness in patients.

Inflammatory and other Exudates.—It has already been mentioned that French workers, notably Blum, have pointed out the powerful diuretic action of calcium chloride in nephritic oedema. Blum has shown a similar action in cardiac oedema. That ammonium chloride acts in a similar manner suggests that it is the acid properties of these salts which are responsible for their action as a diuretic, though the calcium may have an effect in the same direction by its antagonistic action to sodium. Blum[23] has extended his observations to inflammatory exudations, and has reported beneficial therapeutic effects in pleural and peritoneal effusions and in inflammation of the conjunctiva. It may be argued that the suppression of inflammatory reaction is not desirable, except occasionally, when exudations have embarrassing mechanical effects; but Blum's arguments are based on clinical improvement and the disappearance of fever as well as on the absorption of exudates. Based presumably upon this action of calcium ions and of chlorine ions on exudations and transudations, beneficial results of the administration of calcium chloride have been reported in such conditions as oedema of the glottis,[24] asthma,[25] oedema of the lung,[26] angioneurotic oedema, urticaria, and Raynaud's disease. If convincing evidence can be brought forward that such beneficial actions are due to calcium, an extensive and important addition will be made to the scope of calcium therapy.

Methods of Administration.

Oral.—Most writers agree that oral administration of calcium salts is inconstant in its effects, and at best produces only a moderate rise in the level of the serum calcium in healthy subjects. The normal calcium requirement for a healthy adult has been variously estimated, but the consensus of opinion places it at about 1 gram of calcium oxide daily. Children of 6 to 7 years of age need 0.3 to 0.5 gram, and children of 14 should receive 0.6 to 0.9 gram daily.[18] Denis and Minot[27] found that calcium-poor diets and calcium-rich diets had little effect on the serum calcium. Matz,[18] however, found that a meal containing the equivalent of 0.917 gram of calcium oxide caused no rise in serum calcium, but one containing 1.8 grams caused a rise of 1 mg. per 100 c.cm. at the end of three hours, after which it fell again; and that three meals in a day containing 2.34 grams caused a rise during the day of from 1 to 2 mg. per 100 c.cm. Matz further showed that the ingestion of cod-liver oil and calcium lactate caused a greater rise than calcium lactate alone. Bauer and Ropes[28] studied the effect of doses of 5 grams and of 10 grams of calcium lactate by the mouth in normal subjects, and found variable but definite rises in the serum calcium, maximal in from one to four hours, and maintained, though diminishing, for twelve hours. The average maximal rise after 5 grams was 8 per cent. above the normal, and after 10 grams 14 per cent. Jansen[29] found that when different calcium salts were given by the mouth in doses equivalent to 1.2 grams of Ca, a temporary rise of serum calcium was obtained with a maximum effect in two to three hours. He found the lactate to be without effect, and the bicarbonate to give greater effects than the chloride. Hjort[30] obtained a constant rise in the serum calcium in normal dogs by the oral administration of amounts of the lactate, chloride, and glycerophosphate equivalent to 0.2727 gram of oxide per kilo, but smaller doses of these salts and similar doses of less soluble salts were without constant effect.

It may be concluded, therefore, that the ingestion of calcium salts is able to raise the calcium content of the serum to an extent of less than 2 mg. per 100 c.cm., but that the salts must be given in large doses of 5 to 10 grams to obtain this effect; that such an effect is by no means constant; and that it is maximal in about three hours and passes off in about twelve hours. Such an effect will have a therapeutic value in checking tetany when the calcium content of the serum is not excessively low, but the effect will be maintained only so long as the administration is continued. To obtain a permanent rise it will be necessary to administer parathyroid extract in addition in the case of post-operative tetany, and cod-liver oil, or sunlight, or mercury vapour lamp irradiations in the case of the tetany accompanying rickets. It is not yet clear why oral administration of soluble calcium salts is without effect in some cases. Theoretical considerations point to the conditions of acidity and alkalinity of the digestive tract as likely to affect absorption, and studies on this point would be of value. In the case of rickety infants the absence of vitamin D would appear likely to be the factor that interferes with absorption, even when sufficient calcium is being ingested.

If calcium should prove to be essential to the diuretic effects obtained with calcium chloride, and to the effects on inflammatory exudates and local transudates, then all these conditions could be treated by similar large doses administered orally.

Intravenous.—The intravenous injection of 2 grams of calcium chloride dissolved in 50 c.cm. or 100 c.cm. of water can be utilized to raise the serum calcium promptly, and if given slowly no ill effects are produced. By this means the serum calcium can be raised 100 per cent., but the effect is transitory. This method is useful in controlling the severer manifestations of tetany, the convulsions, and laryngismus. Cameron[24] recommends the intramuscular injection of 1 grain of calcium chloride in infants with laryngismus.

Indirect.—The indirect methods of influencing the calcium in the body are of perhaps greater practical importance than the direct administration of its salts. The influence on its absorption of cod-liver oil, mercury vapour lamp irradiations, sunlight, and the reaction of the contents of the digestive tract have already been referred to. The recent work of Collip[13] on the parathyroid glands, and the elaboration by him of an extract that is constant in its action in normal dogs and capable of standardization, has opened up new methods of approach. This extract is prepared by Lilly and Company under the name of parathormone, and must be administered by injection. Stewart and Percival[31] find that it increases the ratio of diffusible to total calcium as well as raising the total serum calcium. Collip and others have studied its action in post-operative tetany, and Hunter and Aub[35] have reported its successful use in lead poisoning. Reports have been published of its use in one case of severe nephritis[32] and of its failure to influence definitely the course of pulmonary tuberculosis,[33] but there is no clear evidence as to its therapeutic value in these conditions. In spasmophilia, and in tetany accompanying rickets, it is theoretically contraindicated, except as an emergency.

I hope that this discussion will throw some light on the part that calcium plays in the effect of calcium chloride on oedema and on inflammatory exudates, that it will explain the inconstant effects of the oral administration, and that it will enlarge the field of calcium therapy. At present it appears that, apart from the actions of calcium chloride, which are possibly due to the chloride rather than the calcium, the field of usefulness is restricted to the treatment of tetany and deficient calcification of bone, and that even in these conditions other therapeutic measures are necessary in addition to obtain a satisfactory calcium effect. The uses of calcium salts in external applications, and of the less soluble calcium salts as antacids and astringents in dyspepsia, need no discussion.

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II.—THE EFFECT OF CALCIUM IN CHILDREN.

BY

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If the title of this discussion, "The therapeutic uses of calcium salts," means its limitation to a discussion of the role of calcium in those instances in which calcium salts are given medicinally, I have nothing to add to it, because my experience of these drugs is limited almost entirely to their exhibition during the acute stages of infantile tetany. I am therefore greatly relieved that the opener has taken the wider view and has considered the variations in disease of the available calcium in the blood and how this can be increased in those instances in which it is lower than normal. With one modification I entirely agree with Professor Fraser's penultimate remark—for example, that the field of usefulness of calcium salts is restricted to the treatment of tetany and deficient calcification of bone, and that even in these conditions other therapeutic measures are essential to obtain a satisfactory calcium effect. I do not think it is necessary to give calcium salts medicinally in order to produce calcification of bone, because if the diet of a young child be efficient it will contain sufficient calcium to supply the body requirements if only the absorption be normal. Thus estimations of the calcium in the diet in a series of 82 infants showed that the amount of calcium oxide intake varied from 2.36 to 0.43 grams, with an average of 1.129—a figure considerably in advance of that suggested by Professor Fraser as the normal calcium requirement. My remarks will be entirely confined to the problem of the calcium effect in children and the methods by which this can be produced. In dealing with the question of absorption of calcium I propose giving the results of some observations which may throw a certain amount of light on the cause of the inconstant effects of the oral administration of calcium salts.

Professor Fraser refers to the action of calcium chloride being possibly due to the chloride rather than to the calcium, a view strongly held by Gamble and his colleagues, and supported by the well known therapeutic fact that ammonium chloride—which also acts by virtue of its chlorine radicle—and hydrochloric acid will cause a temporary improvement in infantile tetany by producing a rise in the blood calcium. These drugs will also increase the blood calcium in low calcium rickets, but Ross and Scriver have shown that this result is due to a mobilization of calcium from the bones, and therefore the cure of rickets by this means is impossible. The most recent work on this subject is that by Drucker, who has shown that in therapeutic doses ammonium chloride usually causes an uncompensated acidosis, both in normal children and in those suffering from tetany, whereas calcium chloride usually gives rise to a compensated acidosis. Ammonium chloride, therefore, has the stronger acid effect on the blood, but, on the other hand, calcium chloride causes a larger rise in the amount of blood calcium when this is decreased, as in tetany. The effect of ammonium chloride in infantile tetany depends on an increase in calcium ions because the blood is rendered more acid, but that of calcium chloride is more lasting, and due chiefly to an increase in the number of calcium ions resulting from an increase in the previously low total calcium. It would therefore appear that the effect of calcium chloride in tetany is due both to the chloride and to the calcium.

It has also been pointed out by Professor Fraser that the calcium of the serum is partly diffusible and partly non-diffusible, that the diffusible calcium is the part from which the ionized fraction is derived, and that it is the latter which produces the specific calcium effects. If ionic calcium is diminished tetany will occur. According to Drucker the calcium ion concentration in normal small children, calculated on the Rona-Takahashi equation, varies from 3.4 to 2.1 mg. per cent., with an average of 2.6 mg. per cent. The diffusible calcium, as estimated by the method of ultra-filtration through collodion sacs under a negative pressure of 150 mm. of mercury, is stated to constitute 50 to 60 per cent. of the total calcium of the serum; but an attempt to estimate the diffusible calcium in my cases, using a pressure of this amount and filtering for four hours, has given figures almost identical with those given by Drucker for ion calcium, and previously to the publication of his results I had come to the conclusion that in tetany the ultra-filtrate would give a figure under 2.5 mg. and usually under 2.2 mg. per cent.

Spasmophilic manifestations may, however, occur in certain circumstances with an undiminished blood calcium; indeed, some authorities have reported these symptoms when the blood calcium was higher than normal. Pylorio stenosis of infants furnishes some of the best examples of

this condition. Anyone who is familiar with this disease must have seen cases in which convulsions have occurred and recurred and eventually proved fatal, or in which—particularly shortly after the Rammstedt operation—the child showed periods of apnœa and arrested breathing, followed by a period during which deeper breathing occurred and convulsions appeared, and after several such attacks nearly always succumbed. This condition is one of alkalosis resulting from repeated vomiting and high intestinal obstruction, with the consequent loss of chlorine ions. As a result of this alkalosis, although the calcium in the serum is normal or higher than normal, the ionic calcium is diminished. On the other hand, in severe azotaemic nephritis, in which the serum calcium may be low, tetany may not occur because there is present an acidosis, which results in more of the calcium being ionized.

The therapeutic problem, therefore, becomes chiefly one of maintaining the ionic calcium at such a level (in small children over 2.2 mg. per cent.) that the specific effects of low calcium do not occur. Before considering how this can be accomplished I would like to refer to one or two other points in connexion with calcium concentration in nephritis and in coeliac disease. Professor Fraser has referred to the diminution of serum calcium in severe azotaemic nephritis, and accepted the view that this is the result of phosphate retention. Experimentally the injection of phosphates into animals and children has been found to produce this effect, and also to produce tetany. Professor Fraser has suggested the possibility of administering calcium to lower the absorption of phosphate, but I doubt whether this would have any effect, because of the inability of this type of kidney properly to secrete phosphate. In renal infantilism—that is, infantilism associated with severe chronic interstitial nephritis—although the blood calcium is relatively low when compared with phosphorus, yet not infrequently a combination of high blood phosphorus with a normal, or even higher than normal, blood calcium is found. Such a combination, however, is associated with severe bone changes—the so-called renal rickets. It would appear, therefore, that any attempt to maintain a high blood calcium in adults suffering from severe azotaemic nephritis by such methods as the administration of parathyroid hormone would produce an osteoporosis. It is true that tetany may not occur in severe azotaemic nephritis, because of the presence of an acidosis favouring increased ionization of the calcium, but young children are apparently more sensitive than adults to diminution in ionic calcium, and probably, therefore, to prevent tetany they raise their serum calcium to a higher level than the adult by drawing on their calcium reservoirs. They do not always seem to do this, however, with the result that tetany is not an uncommon complication of this form of nephritis; as a temporary method of curing tetany in such cases parathyroid hormone might be helpful, but I have not had any personal experience of its use.

In coeliac disease the serum calcium and ionic calcium are low, as also is the serum phosphorus. If the disease be severe and of long duration rickets and tetany occur as complications, and can be cured by methods that increase the absorption of calcium and phosphorus.

Now what are the factors concerned in the absorption of calcium from the alimentary tract, and how can absorption be increased?

It has been shown that while excessive amounts of calcium in the diet tend to increase the total absorption and retention of calcium, yet they impair phosphorus retention, and vice versa, and that the retention of one element in the intestine by an excessive amount of the other is best explained by the formation of insoluble phosphate of calcium. To obtain the maximum absorption of both elements—a necessary desideratum in infants and young children—the diet should contain amounts of calcium and phosphorus sufficient in quantity and properly balanced. The percentage of calcium in the diet should be greater than the percentage of phosphorus. In children one pint of milk daily will meet both these requirements.

Another factor in the absorption and retention of calcium is the presence of fat in the dietary and its normal absorption from the intestine. The presence of large quantities of unabsorbed fat in the intestine may lead to a negative calcium balance; thus in a case of infantile biliary cirrhosis in which, owing to the exclusion of bile from the intestine, fat absorption was poor, a negative calcium balance was found, and in coeliac disease, a condition in which the fat absorption is very defective, a negative or low calcium retention is found. In precisely the same way a child fed on a low fat dietary may show a negative calcium balance. Thus an infant whose diet—a milk mixture containing 2 per cent. of fat—contained 0.44 gram of calcium oxide a day showed a percentage absorption of 34, but when fed on a mixture containing 0.8 per cent. of fat for seventeen days showed a negative calcium balance, although the daily calcium intake was more than twice as much as in the previous diet. We have found that, in infants showing a normal fat absorption, the fat intake must be from 2 to 10 grams per kilo of body weight to ensure the absorption of 0.1 gram of calcium oxide per kilo of body weight. This effect of fat on the absorption of calcium is due to the presence of the fat-soluble vitamin D.

Telfer has produced evidence showing that the absorption of calcium only occurs in the upper part of the intestinal tract. The solution of the calcium salts in the food is affected by the acid of the gastric juice, and absorption proceeds until the acid mixture of lime and phosphoric acid is rendered alkaline by the intestinal secretions, when calcium phosphate is precipitated in insoluble form. It has therefore been suggested that an increased acidity in the upper part of the intestinal canal would increase the absorption of calcium. Such is, however, not entirely borne out by my observations; thus, in the case of biliary cirrhosis already quoted, in spite of the presence of large amounts of fatty acid in the bowel the calcium balance was a negative one; and in another example of this condition the calcium absorption was very small, although incidentally in both cases the absorption of phosphorus was greatly increased.

Observations have also been carried out in a number of atrophic infants fed on varying dietaries, some being fed on acid milk. The average calcium absorption of fourteen infants fed on lactic acid milk was considerably less than in a group of thirty-one infants fed on ordinary cow's milk mixture. This may in part be due to the fact that children fed on lactic acid milk excrete more fat than those fed on the ordinary mixtures. Four children fed on hydrochloric acid milk (that is, milk prepared by adding 1 oz. of decinormal hydrochloric acid to 4 oz. of milk), however, showed a higher absorption of calcium, and although there was a marked increase in the amount of calcium excreted in the urine, the actual calcium retention was definitely higher than in children fed on cow's milk. On the other hand, Wills, Sanderson, and Paterson found that in two children a positive calcium balance on cow's milk dietary was converted into a negative one by changing their diet to hydrochloric acid milk. Finally, a group of six infants fed on almata, a food which has a buffer value similar to that of breast milk, showed the highest calcium absorption of all the children examined.

Zucker and Matzner found that rats kept on a high calcium, low phosphorus, rickets-producing dietary developed marked faecal alkalinity. It has been shown by Jephcott and Bacharach that in such animals the faecal *p*H can be reduced to the acid side of neutrality by means of cod-liver oil, irradiated cholesterol, or irradiation, and that the alkalinity can be prevented by irradiation; indeed, they have recommended this change in *p*H as a test for the presence of vitamin D. It would appear, then, that it is not the increased acidity *per se* which is so important in the absorption of calcium as the occurrence of vitamin D, which by its presence leads to increased acidity in the intestinal tract.

The absorption of calcium from the intestinal tract is increased by giving by the mouth substances rich in vitamin D, such as cod-liver oil, irradiated cholesterol, irradiated ergosterol, or by exposure to sunlight and ultra-violet irradiation.

The problem of how to increase calcium absorption in coeliac disease is complicated by the difficulty in absorption of fats in this disorder, and because for its efficient treatment it is necessary to give a very low fat dietary for a long period of time. Actually, when the fat in the diet is kept very low indeed the percentage absorption is

increased, but to prevent or to cure rickets and tetany either ultra-violet irradiation or the giving of irradiated cholesterol or ergosterol is essential. The administration of irradiated cholesterol or ergosterol appears to produce better results than exposure to ultra-violet light, but it is advisable to combine both forms of treatment. Irradiated cholesterol or ergosterol must not be given dissolved in oil, as recommended in ordinary rickets and tetany. I administer irradiated cholesterol in powder form and ergosterol in tablets prepared by the British Drug Houses, Ltd. Incidentally these tablets also contain 2 grains of calcium glycerophosphate, but I am sure that the additional calcium is unnecessary.

As I stated in my opening remarks, the number of cases in which I administer calcium salts as such is small, being almost entirely limited to the acute stages of tetany, in which I give calcium chloride in 5 to 15 grain doses thrice daily. In all other cases I find the calcium in the diet (chiefly milk) amply sufficient to produce the calcium effect if absorption be improved by the methods suggested. It is stated by some authorities that cow's milk should never be given in tetany, because of the tendency of some infants to constipation with the passage of large soap stools, which contain considerable quantities of calcium soaps and therefore deplete the body of calcium. This type of nutritional disturbance, which in its severest form has been particularly stressed by German workers (Czerny, etc.) under the title of Milchnährshaden, is in my experience a very rare occurrence. I am not convinced that even in these rare cases the loss of calcium in the soap stool is sufficient to overcome the advantages of the good calcium supply obtained by giving a milk diet; but that there is a certain loss of calcium in children passing soap stools cannot be denied, and therefore there may be some advantage, in those cases of tetany which are complicated by constipation, in substituting almata for milk for a time, and further justification for giving calcium salts in the acute attack.

In the cases of spasmophilia due to alkalosis, to which reference has been made, the methods used to alter the blood reaction and thereby increase the ionic calcium are to give saline intravenously, to operate at once in cases of pyloric stenosis, and to fill the abdomen with normal saline; after operation to feed the infant on lactic acid milk if breast milk be unobtainable, in order to prevent the drain on the body chlorine ions caused by the high buffer value of cow's milk and the necessarily greater amount of hydrochloric acid required for peptic digestion. I must also confess that in a recent case of alkalosis tetany (a boy aged 14) I gave 15 grains of calcium chloride intramuscularly in addition to intravenous salines, with most encouraging results.

III.—THE BIOCHEMICAL ASPECT OF CALCIUM THERAPY.

BY

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The inconstant results obtained in feeding various calcium salts and various calcium-containing foodstuffs are possibly to be explained as the result of the observation that in health the intestinal contents remain slightly acid, while in rachitic animals they are alkaline. In the presence of a copious secretion of hydrochloric acid in the stomach such salts as the lactate, carbonate, and proteinate of calcium would all give rise to calcium ions, which, the reaction remaining acid, would be available for absorption from the intestine. In the absence or reduction of such a secretion these salts would not be ionized to the same extent, and therefore would be less readily absorbed. Other inorganic substances must be taken into account. Thus it is readily seen that a large excess of phosphate would hinder calcium absorption, since, in consequence of the slightly acid reaction of the intestine, some of the calcium would form the insoluble phosphate.

A careful distinction must be made between calcium absorption and calcium retention: the latter is measured simply enough by taking the difference between intake and output; estimation of the former is not so easy. Alterations in the urinary excretion are of little value, since the greater part of calcium excretion occurs through the epithelium of the large intestine. Determinations of the blood calcium content are perhaps better, but still unsatisfactory. As an example of the confusion some recent experiments by Bergeim, who has devised a method for measuring the actual absorption, may be mentioned. He finds that in rachitic animals calcium is absorbed from the small intestine only to be excreted again into the large; vitamin D improves the *retention* (though it seems to me that this is not necessarily the sole effect of the vitamin). By removing the whole of the alimentary canal from our experimental animals Dr. Percival and I have been able to show that the parathyroid hormone does not raise the blood calcium by increasing absorption from the intestine, for in the eviscerated animals the effect of the hormone was as great as in intact animals. By isolating the large intestine and washing out at intervals we estimated the calcium excretion by that route. The urinary excretion was easy to determine. The parathyroid hormone, we found, did not diminish calcium excretion—that is, it did not increase retention. It must act, therefore, by withdrawing calcium from the tissues, and ultimately, at any rate, in long-continued hypercalcaemia, from the bones. Greenwald has shown that in a hypercalcaemia induced by parathyroid hormone the excretion is increased, and that there is a calcium loss from the body. It follows that parathyroid hormone is of no use where it is desired to increase calcium absorption. Further—especially where the absorption mechanism is impaired—its long-continued use to raise the blood calcium level may lead to the undesirable effect of depletion of the body stores.

Calcium circulates in the blood stream, and it may reasonably be assumed that in this, as in other cases, changes in the tissue content will be, to some extent at least, reflected in the concentration in the blood. Moreover, though on this point there remains a slight element of doubt, it seems that the calcium of the blood is confined to the plasma and that the corpuscles contain at the most only traces. Hence the plasma calcium content forms a valuable guide as to the state of the animal with regard to calcium metabolism. True plasma is difficult to obtain, and experiments with citrated plasma, based on the assumption that sodium citrate does not precipitate any calcium, have led to the statement that the plasma and serum contain equal amounts of calcium and, consequently, to the universal use of serum for calcium estimations. Actually, true plasma contains 10 to 20 per cent. more calcium than does the serum, but for most purposes this does not destroy the usefulness of the serum estimations as an index of normal functioning. Figures obtained by analysis of serum are certainly of more value than those obtained from whole blood, owing, *inter alia*, to the variability of corpuscle volume.

Of the 10 mg. of calcium normally present in 100 c.cm. of human serum only some 2 mg. exist as calcium ions, and only about 6 mg. are able to pass through a collodion membrane. The remaining 4 mg. are in some non-diffusible form of combination—part as un-ionized salt or complexes of protein, and part, possibly, in un-ionized combination with lipoid material. Whether the plasma calcium is distributed in a similar manner we cannot say with certainty. Vines's work would appear to indicate that it is not. On the other hand, evidence derived from *in vivo* filtration of the plasma, such as may be obtained by analysis of the cerebro-spinal fluid and of saline solutions which have been enclosed for some time in the peritoneal cavity, indicate a similar distribution of calcium in serum and plasma.

Holt, La Mer, and Chown believe that the blood is normally supersaturated with calcium phosphate, $Ca_3(PO_4)_2$, to the extent of more than 200 per cent., since on shaking serum with solid calcium phosphate there is a reduction in both the calcium and the phosphate concentrations, although no such reduction takes place in the absence of the solid phase. They explain the supersaturation as due to the sudden change during absorption from the acid reaction of the intestine to the alkaline reaction of the blood, a

change which causes the production of trivalent PO_4 (from monovalent H_2PO_4 and divalent HPO_4) at a rate greater than the calcium phosphate can be precipitated. Though this is an extremely interesting suggestion—it implies, for example, that the fluids bathing osteoid tissue are supersaturated with calcium phosphate in presence of the solid phase, a condition which would lead to deposition of more solid calcium phosphate—Holt, La Mer, and Chown do not seem to have taken into account sufficiently the presence of bicarbonate and of a large part of the serum calcium in the form of non-diffusible protein or lipoid complexes. Indeed, it has also been claimed that blood is supersaturated with respect to calcium bicarbonate.

The diffusible, and especially the ionic, calcium of the plasma is doubtless most readily available for transference to other tissues, and is often referred to as the "active" or "available" calcium. In using these somewhat dangerous terms, however, two things must be borne in mind. In the first place, we really know nothing about the functions of the different calcium derivatives present in the blood, and it is perfectly conceivable that the non-diffusible fraction may have its own special uses. Secondly, neither the absolute nor relative concentrations of the different calcium compounds can be regarded as fixed and immutable; they form a series of mutually dependent equilibria, so that alteration in the concentration of one constituent may be followed by a readjustment throughout the whole complex system.

IV.—PHARMACOLOGICAL AND THERAPEUTIC ASPECT.

BY

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IT has already been emphasized, in the opening paper, that the presence of calcium is necessary for the life and activity of the various cells and systems of the body. It is not possible, however, in view of the existing state of our knowledge, to present a coherent account of its exact mode of action, or to offer an explanation of its indispensability. Such explanation must await the solution of a multitude of physical and chemical problems of the most complex and fundamental nature. Certain facts, however, have long been known.

In the first place, Sidney Ringer determined the concentration of calcium required to maintain the normal activity of the frog's heart, and noted the effect on it of variations in this amount. Later workers have studied the effect of calcium-containing solution on other tissues, and also on the less highly organized forms of life. Many of the experimental results obtained have been questioned, and the interpretation of those which are now generally accepted is by no means clear. There is nevertheless an increasing amount of evidence in favour of the theory that calcium is intimately associated with the lipoid complexes of the cell membranes, and that variations in the calcium content of the fluid bathing the cells tend to produce alterations in the physical structure of these complexes. The property of semi-permeability possessed by the cell membrane is thus interfered with and the activity of the cell modified accordingly. The general action of calcium appears, therefore, to be exerted at the surface of the cell.

Experiments on the lower animals have shown that certain tissues, notably the cardiac and skeletal muscles, and the nerves, are extremely sensitive to slight variations in the calcium content of the fluid in which they are bathed. Presumably this is so in the human subject, and, as has already been stated by Professor Fraser, the calcium concentration in human serum is found to be remarkably constant. In certain diseases, however, considerable variations do occur, and it is worthy of note that it is only when the serum calcium has been reduced to from 60 to 70 per cent. of its normal value that symptoms which can be attributed to such a diminution make their appearance. The most constant change accompanying such a reduction is increased excitability of the peripheral nerves to electrical, and to a less extent to mechanical stimulation, and it would seem, therefore, that these structures are more sensitive to lack of calcium than are the more delicate organs such as the heart and the central nervous system. On the other hand, an increase of 20 to 50 per cent. in the serum calcium, such as has been found in osteitis fibrosa, is unaccompanied by any symptoms apart from those associated with the local bone condition. Nevertheless, despite the fact that wide variations in the serum calcium are compatible with the apparently normal functioning of the body cells, there exists a very efficient mechanism for controlling the concentration of this substance in the serum.

Various factors are concerned in this control—the availability of the ingested calcium, the body stores, the reaction of the tissues, the presence or absence of vitamin D, and the parathyroid hormone. Before continuing it may be well to emphasize the delicate correlation of all these factors. In the first place, the remarkable constancy of the serum calcium, not only among different individuals, but also in the same individual. Further, the alteration of one of these factors produces a very rapid response—for example, the intravenous injection of sodium bicarbonate or parahormone produces its maximum effect within an hour, and the return to normal is equally rapid. Moreover, by simultaneous injection of appropriate doses of these substances it is possible to maintain the serum calcium unchanged. It may also be mentioned that in rickets vitamin D may be quantitatively deficient without more than a slight fall in the serum calcium. Again, severe haemorrhage producing a 50 per cent. reduction in the haemoglobin is unaccompanied by any fall in the serum calcium of dogs and cats, animals which are sensitive to the parathyroid hormone, whereas in the relatively insensitive rabbit such haemorrhage causes a definite lowering of the serum calcium. This evidence, besides illustrating the delicacy of the controlling mechanism *in toto*, also points to the parathyroid hormone as being the chief controlling factor.

Turning now to survey the results of calcium administration in disease it is not surprising to find, in view of the foregoing facts, that calcium as a therapeutic agent has proved most disappointing. The large available store of calcium in the bones and the constant supply in the daily food intake make it extremely unlikely, except in very rare instances, that the regulating mechanism ever lacks calcium for distribution throughout the body fluids, so that it is only in the event of failure of function of some part of this mechanism that the tissues suffer from calcium deficiency. Shortage of vitamin D may either cause deficient calcium absorption from the bowel or interference with the process of ossification, and in these circumstances no amount of calcium given by the mouth or intravenously is likely to alter the degree of its utilization by the tissues.

In the case of parathyroid deficiency a different set of factors is operative, and there is primarily no interference with absorption. A temporary rise in the serum calcium, with a coincident alleviation of symptoms, may be produced by the oral administration of calcium, as well as by its intravenous injection. The effect is only temporary, however, for the function of regulating the distribution of calcium between the blood and the body fluids has been lost. Calcium therapy, therefore, is merely palliative.

Spasmophilia is also temporarily relieved by the administration of calcium salts, although the accompanying rachitis is not benefited. In this instance there is no doubt that calcium can be absorbed from the intestine in sufficient amounts to raise the serum calcium above the tetany level, even at a time when the tissues are suffering from a deficiency of vitamin D.

A consideration of pregnancy reveals a sequence of events which may lead to another variety of deranged calcium metabolism. The constant demand on the part of the growing foetus for calcium obviously subjects the maternal tissues to a severe strain, and in some cases these may be taxed beyond physiological limits. Animal experiments have demonstrated the fairly frequent occurrence of a negative calcium balance during pregnancy and lactation. One obvious cause of this derangement is that the maternal diet contains an insufficient amount of calcium to meet the requirements both of the maternal organism and of

the foetus, although sufficient for the former alone. Again, in the human subject the serum calcium is frequently somewhat diminished during the later weeks of pregnancy, and a low serum calcium has been found in cases of eclampsia. These facts would warrant attention being paid to the supply of a liberal daily ration of calcium in the maternal diet throughout the periods of pregnancy and lactation.

The condition of osteomalacia occurring in pregnancy cannot be definitely attributed, however, to a mere deficiency in the supply of calcium, since its course is not arrested by the administration of calcium. The biochemical methods now available do not yet appear to have been applied to an investigation of the etiology of this condition, about which very little is definitely known. In the allied condition of osteitis fibrosa, where decalcification of bone is also the most striking feature, the serum calcium has been found to be very much higher than normal, and adenomatous tumours of the parathyroid glands have been present in a number of cases. These findings suggest that the condition is due to the occurrences of hypersecretion of the parathyroid glands, and this would account for the failure of calcium therapy.

The conditions which have been so far dealt with have all presented definite abnormalities in calcium metabolism, the mechanism responsible for this derangement has been to some extent accounted for, and the value of calcium therapy discussed.

Calcium therapy has been advocated in numerous other diseased conditions on purely empirical grounds. In many of them this method of treatment has been credited with quite remarkable curative effects, but in the majority of cases these have been discredited after a more prolonged and extensive trial. There remain, however, certain conditions in which calcium is still recommended, but in which there appears to be no indication for its administration, either in view of the pathology of the disease or of the clinical results obtained by such medication. It has recently been revived in the treatment of chronic infective conditions, on the assumption that the serum calcium is either diminished in amount or that there is some alteration in its physical condition. Impairment of the defence mechanism of the body against organismal infection is said to be brought about by such a change, with the result that chronicity is favoured. The condition quoted as an outstanding example of this type of derangement, and as benefiting from calcium therapy, is that of chronic leg ulcer. It may be definitely stated, however, that in this disease the serum calcium is normal both as regards its concentration and its physical state, and that the raising of the serum calcium and the alteration of its physical state by administering calcium salts and parathyroid extract does not hasten recovery. The same may be said of the various forms of inflammatory and infected skin lesions and of chronic rheumatism.

Another group of diseases in which an attempt has been made to obtain relief by the administration of calcium is that resulting from a lack of tone in the superficial vessels of the extremities with consequent circulatory stasis in the capillaries and venules. This gives rise to a group of closely allied symptom complexes, including erythema pernio, "raw beef" hands, and chronic erythema of the legs, and is an almost invariable precursor of erythema induratum. Calcium has long been advocated in erythema pernio, and the apparent success of this treatment has led to its trial in the closely allied disorders mentioned. In none of these conditions, however, are there any grounds for concluding that calcium therapy might be efficacious. In all of them the serum calcium is normal, both as regards amount and physical state, and clinical benefit does not follow the administration of calcium alone or combined with parathyroid extract, even when a very definite alteration in the serum calcium is obtained by such means. In erythema pernio sudden and extreme variation in severity is a clinical characteristic of the condition, and is responsible for the reputation gained by calcium as a curative agent, for in those somewhat rare examples which are persistent calcium therapy proves a failure.

It would appear that derangements of calcium metabolism are confined to a very small number of pathological conditions, and that, with a possible exception in the case of pregnancy, such derangements are almost always due to a deficiency in some part of the controlling mechanism. For this reason calcium therapy appears to have a very limited field; moreover, in those instances in which it has proved useful, the effects are merely palliative, and may be better achieved by other means.

Discussion.

Professor L. Blum (Strasbourg) discussed the administration of calcium salts as a therapeutic measure in cases of nephritis, with ascites and oedema. He illustrated with diagrams and tables the results which he had obtained. In certain cases, where no diminution of ascites or oedema had followed resort to a salt-free diet or the administration of diuretics, large doses (10 to 20 grams a day) of dry calcium chloride had given rise to copious diuresis, with consequent relief of ascites. He had found that, to obtain the effect, the calcium chloride must be added to an otherwise completely salt-free diet. The effect was much less marked if other salts were given with the calcium. The lactate was much less effective than the chloride. If the calcium chloride was replaced by sodium chloride there was an immediate and marked increase in the dropsy. Oedema due to other causes was more refractory to calcium treatment. When the condition was caused by cirrhosis of the liver such drugs as novasurol were definitely dangerous. In such cases calcium salts might safely be given, and were on the whole useful. In cases of pleurisy, Professor Blum had observed that the administration of large doses of calcium chloride was followed by clinical improvement, and a fall in temperature and pulse rate. The diuresis in such cases was small, because the actual fluid retention was usually not very great. It was not advisable to continue the administration of calcium for too long a period. Professor Blum then discussed the condition which he had named "dry chloride retention," in which the chief factor was a disturbance of the ratio of sodium and chloride ions in the tissues, particularly in the brain, the proportion of chlorine being raised and that of sodium diminished. In both body fluids and tissues the balance between sodium and chlorine ions, CO_2, and "protein acid" was disturbed, giving rise to an alteration of hydrogen-ion concentration. The administration of large quantities of calcium chloride might give rise to this condition of "dry chloride retention." In the pure "hydratic" type of nephritis the chloride retention affected only the fluids; the ionic relation in the tissues was normal. Professor Blum admitted that in these cases the increase of chlorine ions appeared to be the potent factor, but some definite and specific effect was also assignable to calcium ions.

Dr. G. C. Linder (London) said that tetany was a response of the body to several different clinical states, which fell, however, into two groups. In the first of these were infantile, parathyroid, intestinal, and phosphate tetany, in all of which the serum calcium was much decreased; in the second were gastric, bicarbonate, and overbreathing tetany, in which the serum calcium was normal, but its effectiveness was reduced by such abnormalities as increases in *p*H, bicarbonate, or phosphate. Calcium salts were effective in the first group. Intravenous calcium chloride immediately and completely relieved the symptoms; 2 grams were required in the case of an adult with parathyroid tetany, and the effect passed off with the excretion of the calcium in a few hours. The salt would cause sloughing if it passed outside the vein; this treatment was, therefore, an emergency one. By the mouth calcium chloride was less certain. In doses of 10 grams a day it gave dramatic relief to the symptoms of a patient with intestinal tetany, but this was probably due not so much to the small rise in serum calcium as to the accompanying changes in *p*H and bicarbonate, since calcium chloride by the mouth was a powerful agent in the production of acidosis. Determinations of calcium excretion showed that a large amount of calcium was retained in the body although the serum calcium rose but little. When 20 grams of calcium lactate were given instead of the chloride

to a patient suffering from tetany, active tetany at once appeared, but disappeared again after two days; it was probably due to the readjustment of the acid base balance. A slow increase in serum calcium followed, and the patient remained free from active tetany. A return to calcium chloride was followed by a prompt rise of the serum calcium to normal figures, and the signs of latent tetany disappeared. The body now, after fifty days of massive calcium therapy, behaved as though it were rich in calcium, and responded to parathormone (Collip) in a way in which it had failed to do before. More difficult to interpret were the results obtained in the treatment of a case of parathyroid tetany; 150 units of parathormone with 6 grams of calcium lactate were comparatively ineffective, but when foci of sepsis were removed and calcium chloride substituted for calcium lactate there was immediate clinical and chemical improvement on a much lower dose of parathormone. It was suggested that sepsis vitiated the action of parathyroid extract as it did that of insulin. The calcium chloride was probably effective more by its acid effect and by promoting a fall in serum phosphate than by virtue of its calcium ion. Ammonium chloride would probably have acted equally well. In this case, also, prolonged calcium therapy enabled parathormone to develop its full action. No experiences with cases of tetany of the second group were available, but it seemed probable that in all of them calcium chloride by the mouth would be of benefit by its effect in provoking an acidosis. By way of absorption of calcium it would be of no value; calcium lactate should therefore not be given.

Dr. NORMAN BURGESS (London) stated that for the estimation of the serum calcium he had employed the method described by Laidlaw and Payne in 1922. Pathological cases showing a diminished serum calcium fell into two groups: in the first the total calcium was normal while the precipitable calcium was low; in the second both total and precipitable calcium were markedly diminished. Dr. Burgess then discussed the biological method employed by Vines, which depended on the recalcification of oxalated blood by the addition of the material to be tested, and the comparison of the action of the latter with that of calcium chloride solutions of known strength. Vines and Grove found that injection of calcium chloride or administration of parathyroid increased the readily precipitated calcium in the serum, and that clinical improvement accompanied this increase. With reference to calcium metabolism in skin diseases Dr. Burgess's work included the investigation of sixty-seven patients, of which the majority were cases of urticaria, prurigo, or acroasphyxia. Of the urticarial cases a clinical distinction could be made between those in which dermographism was a marked or predominant symptom and those in which it was absent or slight. Of the former four cases were examined, and without exception gave a very low figure for the precipitable calcium, while in three cases the total calcium was normal. In one case the dermographism was so marked that rubbing the face and hands with a towel caused them to become swollen. Following treatment with calcium chloride and parathyroid extract after meals, the patient's condition became practically normal. In another case, after twelve days' treatment the precipitable calcium had risen from 3.9 mg. to 8.3 mg. per cent., and there was considerable clinical improvement. All the patients without dermographism showed a diminished precipitable calcium, but the figures were not so low as in the former cases. The prurigo was mostly of the Besnier type, associated with ichthyosis, asthma, hay fever, and eczema; only one of the sixteen patients gave a normal figure for the precipitable calcium. In the majority of the cases the total calcium was normal. In one case, associated with vitiligo, the precipitable calcium rose from 5.3 mg. to 9.75 mg. per cent. after one month's treatment with calcium chloride and parathyroid extract, and the symptoms disappeared. On the whole a considerable improvement had been noticed in the majority of these cases of prurigo under treatment with calcium and parathyroid. Of fourteen cases of acroasphyxia, eight gave normal figures for the total and precipitable calcium, while in the remainder the precipitable calcium was much diminished. Two cases of generalized alopecia areata gave very low figures for the precipitable calcium, the total calcium being slightly below normal. Of four cases of psoriasis only one gave a low figure, the remaining three being practically normal. In seven cases of eczema the precipitable calcium was lower than normal. One case examined after treatment showed considerable improvement, and the precipitable calcium had risen from 4.5 mg. to 7.5 mg. per cent. The total calcium was normal in five cases and slightly diminished in two. In all the cases of light sensitization (adult type) examined the precipitable calcium was lower than normal, the total calcium being approximately normal. Five cases of seborrhoeic dermatitis were investigated, of which two were normal, one showed slight diminution of both total and precipitable calcium, while the other two showed marked diminution of the precipitable calcium. In two cases of total alopecia areata there was a diminution both in total and in precipitable calcium, but particularly in the latter. One case of erythema multiforme showed a slight diminution, while a case of Darier's disease and another of acrodermatitis continua both gave normal values. Dr. Burgess added that it was clear from the results obtained in this series of cases that the precipitable calcium of the serum tended to be diminished in those diseases which were associated with involvement of the sympathetic or endocrine-sympathetic systems, such as urticaria, particularly when associated with dermographism, prurigo, especially in the ichthyosis-asthma-hay fever-prurigo syndrome, acroasphyxia, and alopecia areata. Good results might be expected to follow treatment with parathyroid extract and calcium when the precipitable calcium was low in cases of urticaria with dermographism; encouraging results had been obtained in some cases of prurigo.

Dr. C. G. LAMBIE (Edinburgh) said that osteitis fibrosa was a chronic disease characterized by rarefaction of the bones, the presence of bone tumours containing giant cells, and by hyperplasia of the parathyroid glands, the latter being sometimes as large as a pigeon's egg and easily palpable in the neck. This coexistence of osteoporosis and enlargement of the parathyroids suggested some connexion between the two, and led him to examine the calcium metabolism in such cases. A marked hypercalcaemia was found, the amount of calcium present being 17 mg. per cent., a figure comparable with that found by Collip in dogs injected with large doses of parathyroid extract. The blood inorganic phosphate was slightly lowered, but the acid-soluble phosphate was normal. The magnesium, chloride, urea, and non-protein nitrogen were normal. The clotting time of the blood was unchanged. The CO_2 combining power of the blood was increased by 5 per cent., perhaps owing to the increased amount of base in the blood brought about by the hypercalcaemia. The patient was kept on a diet of milk alone and his calcium balance was tested over a period of a week. The output of calcium in the urine was about normal, but there was a considerable increase in the output of calcium and phosphate in the faeces, the result being negative calcium balance for the period of observation. These findings were similar to those found by Greenwald and Collip in dogs treated with parathyroid extract, and suggested that the decalcification of bones was due to excessive secretion of parathyroid hormone by the hyperplastic parathyroids, the effect of the hormone being to cause the mobilization of calcium in bone. If this interpretation was correct, osteitis fibrosa would be a metabolic disorder, analogous to acromegaly or exophthalmic goitre, and not merely a disease of bone. While the parathyroid hormone brought about the mobilization of calcium in bone, the effect of vitamin D appeared to be to promote the synthesis and deposition of calcium phosphate. The value of vitamin D as a therapeutic agent was not confined to rickets. He had found it raise the blood calcium to normal in a case of fragilitas ossium. It also seemed possible that some of the benefit of cod-liver oil, ultra-violet irradiation, and sunlight treatment in tuberculosis was associated with the increased deposition of calcium phosphate around tuberculous foci, thus aiding in the natural process of cure. It appeared significant, in this connexion, that this treatment was most efficacious in tuberculosis of bone and glands.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

CONVULSIONS CAUSED BY PITUITARY EXTRACT AFTER LABOUR.

The following extraordinary reaction to a therapeutic dose of pituitary extract merits a short description, as such an event does not seem to have been recorded before.

The patient was a fat multipara, aged 40, who had suffered from atypical diabetes for some seven years and had been treated with insulin during her last pregnancy. On September 16th, 1927, a stillborn foetus weighing 12½ lb. was delivered after a difficult forceps operation, the cause of death being haemorrhage from a tear in the tentorium cerebelli.

Insulin was stopped after labour, without sugar or acetone appearing in the urine.

Four days after delivery the uterus was lax, and 10 units of pituitary extract (1 c.cm. pituitrin) were given intramuscularly at 11.20 a.m., and produced a very alarming condition which had at one time the appearance of being fatal. At 11.30 the patient complained of faintness. At 11.40 she felt sick and retched but did not vomit anything. Beads of sweat covered her face, which was ashy white. She asked urgently for the bedpan and began to pass a liquid motion, when she collapsed forward as she was being held on the pan. Her head drooped, the eyes were closed, she breathed heavily and seemed quite unconscious. She was laid flat in bed and then became stiff all over like the tonic stage of epilepsy, and the firmly clenched jaws had to be propped open to prevent her biting her tongue severely. The breathing was heavy, stertorous, and obstructed, and her colour, which had been white, became blue and cyanosed. At 11.50 the pulse rate was 140 and the systolic blood pressure 70 mm., as far as could be made out. She began to recover consciousness, and at noon scratched her head and stomach fiercely and asked what was the matter with her. For a few moments muscular twitchings occurred and were especially violent in the jaws and hands. She was very confused mentally and asked for her husband, whom she appeared to think was just outside, and for the baby which had been stillborn four days previously. At 12.5 p.m. the pulse rate was 120 and she complained of headache and itching and trembling all over. She was very restless, afraid she was going to die, and wanted to sleep but could not. At 12.30 the bowels were opened and she complained that she could not see. She slept for short snatches, and at 1.15 said that she could see better but felt very cold; the pulse was 120. At 2 she vomited three times, but her mind was becoming clearer. By 4 o'clock her mentality was quite normal and the pulse rate 116. At 6 p.m. the blood pressure had risen to 96/52, which is her usual pressure. Two hours and a half after the dose of pituitrin the blood sugar was raised to 0.186 per cent., although no food was given; she passed a considerable amount of sugar that evening and traces for the next few days, whereas she had been sugar-free before this attack. She felt quite well on the day after the attack.

So far as we are aware there is no record of such a severe attack after pituitrin, although pallor, dizziness, and colic are common enough. The course of this patient's diabetes (which will be published later) suggests a hyperactive pituitary, and the bitemporal constriction of the fields of vision suggests the same thing, although no definite acromegalic symptoms are present. The severity of the symptoms experienced after the pituitrin may therefore be due to an overactive pituitary gland.

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M. P. Shackle, B.A.

London, W.1.

INVERSION OF THE UTERUS.

In view of the case of uterine inversion reported by Dr. J. C. Fotheringham in the Journal of August 27th (p. 350) it may be of interest to record details of a patient I attended for the same condition.

A woman, aged 22, sent for me to attend her at her first confinement on July 20th, 1927. With the aid of forceps I delivered her of a normal healthy female child.

The placenta appeared somewhat adherent, so I allowed forty minutes to elapse before making final efforts to express it; it came away without undue pressure, but when I attempted to separate it by torsion I found the inverted body of the uterus in my hands. I peeled the placenta from the endometrium and examined the latter; the surface appeared plum coloured and of a velvety consistence with a few oozing points of blood here and there, but no excessive bleeding. After the nurse had irrigated the exposed surface with saline solution I endeavoured to reduce the inversion but failed. Since the patient showed signs of collapse I made no further efforts except ordering hot saline douches night and morning and general stimulating diet. Ten days later under a general anaesthetic I reduced the inversion by taxis, which took about fifteen minutes. The patient made an uneventful recovery, and is now perfectly well.

There was very little haemorrhage in this case, but the evidence of shock and collapse at the time decided me to hold my hand till a later date; this was justified by the result.

Hove, Sussex. J. G. Hayes, L.R.C.P. and S.I.

COMPOUND FRACTURE OF THE HUMERUS: SPONTANEOUS REPAIR.

The following case is of interest on account of the unusually good result which followed such primitive treatment of the fractured arm.

An East African (Swahili) boy, aged about 14, applied for treatment at the native hospital, Dar-es-Salaam, Tanganyika Territory, in 1926, complaining of "the bone of the arm" (right).

The history given was of a fall from a tree "several months before"; owing to the usual native inability to reckon lapse of time this was the nearest estimate of the period which could be obtained. As a result of the fall the right upper arm was broken at about its middle, and bone protruded from a wound. The patient stated that he himself tied a stick to the injured arm, and that he kept the stick on for about two months. He then removed the stick, and found that he had some movement of the arm, but the bone still protruded. His power of movement of the arm continued to improve, but the bone did not go away, so he came to a white doctor for treatment.

Briefly, on examination there was seen some slight wasting of most of the muscles of the right arm compared with the left, and some outward bowing of the upper arm. At a point about the junction of the middle and lower third of the upper arm, and just external to the lower part of the biceps muscle was protruding a jagged piece of bone about three-quarters of an inch long, surrounded at its base by scar tissue, which appeared healed and clean. On seizing the projecting bone only slight movement of it could be effected. The right humerus seemed intact, and the movements of the right arm were only slightly limited compared with those of the left. There was no pain or tenderness, and no shortening could be made out on measurement. There was no evidence of nerve involvement.

A skiagram showed that the humerus was intact, with outward bowing and some thickening at what was presumably the old site of fracture. There was a detached fragment leading from this point downwards and outwards, and ending outside the flesh shadow, with some periostitis at its base. With simple expectant treatment the fragment was eventually withdrawn with forceps, and the resulting sinus healed quickly.

The photograph is of the case shortly after it was first seen. Such a good functional result after such crude treatment must be very exceptional, and it is an interesting conjecture as to what could have been the original bone injury.

C. R. Steel, M.R.C.S., L.R.C.P.,
D.T.M. and H.Lond.,
Medical Officer, Tanganyika Territory, East Africa.

THE "RISING TEST" FOR ACUTE ABDOMEN.

For the last two years I have been using a test, both in private and hospital practice, which has proved exceedingly useful—more especially in those borderline cases (chiefly cases of appendicitis, where one might reasonably be persuaded to put off operation, perhaps until the next day or so.

The "rising test" consists in the patient putting both hands down by the side of the thighs and then raising himself in bed by means of the abdominal muscles. This produces pain immediately, and the patient fails to raise himself or complains of pain in doing so. This test will prove positive when there is little or no tenderness in the abdomen. In my hands it has frequently proved the presence of acute abdomen, and is often the decisive factor in doing an immediate operation. The test is a sign of an acute abdominal condition, not necessarily appendicitis, and applies equally well in any acute abdomen.

The rising test has been tried by a physician in a large teaching hospital, who writes to me that it is working well.

C. L. Granville Chapman, F.R.C.S.I.,
Surgeon, Grimsby and District Hospital.

CONGENITAL OCCLUSION OF THE SMALL INTESTINE.

THE following case resembles in some respects that described by Dr. B. Shea in the BRITISH MEDICAL JOURNAL of September 24th (p. 549).

A male child, the seventh in the family, was born in December, 1926. He was well nourished and weighed 8 lb. He passed no meconium, but some greenish mucus, and the anus admitted the little finger. At first he took the breast well, but on the third day he began to vomit about half an hour after feeds, first bile-stained fluid and later faecal material. This continued, with increasing distension of the abdomen, till he died on the sixth day.

At the necropsy it was found that the distended upper coils of the small intestine ended in a bulbous part. There was about an inch of mesentery, with a tiny cord attached to its free border, then another much smaller bulb continuous with the lower six inches of ileum. The caecum and other parts of the large intestine were present, and rotated perfectly, but they were very small in size. There was an intussusception of the ileum, probably agonal, as it was not inflamed, about an inch below the occlusion, and an inch and a half in length.

The mother had been treated for syphilis during previous pregnancies, but her Wassermann reaction was negative. Several small lymph glands in the mesentery, near the occlusion, were examined for spirochaetes by Dobell's method, but none were found.

Tunbridge Wells. SIDNEY E. CROSKERY, M.B., Ch.B.

Reports of Societies.

THE FUTURE OF RADIOLOGY.

AT the first sessional meeting of the Section of Electrotherapeutics of the Royal Society of Medicine, on October 21st, Sir HENRY GAUVAIN delivered his presidential address, and three short communications were made by distinguished visitors from the United States, Denmark, and Switzerland respectively, who had been elected corresponding members of the Section.

Sir Henry Gauvain said that he took his election to be an indication that the Section regarded the science of electrotherapy as embracing the whole range of electromagnetic vibrations in their application to the relief of human suffering. It was no exaggeration to claim that no branch of medicine could record such rapid advance of recent years. A century ago few could have conceived that by submitting the subject to forces impalpable, invisible, and intangible the inner secrets of the human structure could be clearly revealed, malignant growths dispersed, and rickety bones restored to normal. Though it was not yet to be explained how these and other effects were produced, they were so readily and certainly achieved that they had ceased to be surprising. Whither would these forces lead? It was right to give rein to the imagination if, as in this event, the imagination sprang from a foundation of facts already familiar. It would be alluring to discuss the possible future developments of electrotherapeutics, but there were present in the Section three distinguished visitors from other countries who would indicate some recent advances for which they were responsible. He would make only one personal observation. It appeared to him that the advance which electrotherapeutics was making in all its applications was so rapid and important, so pregnant with possibilities, that not only was the employment of highly expert practitioners called for in this branch of scientific medicine, but it was imperative that all medical practitioners should have a certain clear knowledge of the principles and practice of electrotherapeutics. The time had come when all medical students should have systematic instruction in these methods. The status of the radiologist on the staffs of teaching hospitals should be improved. The advent of a diploma in radiology was to be welcomed, but it was not enough. It might encourage more specialization in this branch of medicine, and that was a good thing, but what was more needed was a larger general knowledge amongst medical men of the significance and importance of the subject. The electrotherapeutist should have equal rank with the physician and surgeon. Not only should he have his department, which should not be considered a subordinate department to any other, but he should have his own wards, beds, and teaching facilities. The interests of patients demanded that the proper recognition of this branch of medicine should not be further delayed.

Radiological Methods in Diagnosis of Pulmonary Tuberculosis.

Dr. H. K. DUNHAM (professor of electrotherapeutics, University of Cincinnati), who addressed himself to the subject of radiological methods in the diagnosis of pulmonary tuberculosis, said that the radiologist, if he hoped to help the clinician in medicine, must translate for him *x*-ray densities into pathology. To do this it was necessary to use the stereoscopic method, by which alone it was possible to make useful study of the shadows with their pathological significance. In the single plate some of the subtler variations of density as between different areas were apt to be lost. Dr. Dunham exhibited a large number of radiograms of chest conditions, and pointed out the markings which showed the stage and condition of the tuberculosis. A number of the examples were included to illustrate what he called the fan indicating tuberculosis producing exudate. It was, he thought, too common in the United States for radiologists, while anxious to ensure that their radiological methods were sufficiently perfected to detect the earliest signs of tuberculosis, to fail to realize, what he thought was the greatest value of *x* rays in this connexion, that the *x*-ray method enabled the physician to exercise care and control over the whole progress of the case. He also begged radiologists not to try to do too much; they should concentrate on giving the clinician some definite information relating perhaps only to a small fact, rather than make a guess at something on which their methods did not enable them definitely to pronounce. Locked up in the *x*-ray plate was pathology. The *x*-ray pictures must be translated back into pathology, and the clinician must translate back into pathology his physical signs. Without this, the work on the chest would be lost to a large extent.

Treatment of Pulmonary Tuberculosis by Modern Methods.

Dr. J. GRAVESEN (medical superintendent, Vejlefjord Sanatorium, Denmark) also showed a number of lantern slides illustrating some recent results in the treatment of tuberculosis. He dealt with the effect of artificial pneumothorax and sanocrysin; both had reduced the number of failures in tuberculosis treatment, and had greatly shortened the period. The reason why such different opinions were expressed with regard to the chemotherapy of tuberculosis was that the good effect of the agent was not to be expected in all tuberculosis cases, but only in those where there was exudation or fresh spread. The sanocrysin specific treatment covered those cases in which the affection was of an exudative character. Artificial pneumothorax covered just those cases in which sanocrysin failed; it was useful where there was fibrosis of the lungs of a chronic type, which did not react well to the ordinary sanocrysin regime. From the *x*-ray picture the best indications could be obtained for choice of treatment in tuberculosis. A number of the lecturer's lantern slides illustrated the good effects of both these treatments in selected cases. In some instances both treatments had been applied to the same case—collapse therapy to the one lung, and sanocrysin to the other. He also urged close co-operation between the radiologist and those engaged in the treatment of tuberculosis, so that a qualitative diagnosis might be reached with the greatest sureness.

X Rays in the Treatment of Breast Cancer.

The last of the three visitors to speak was Professor HANS ISELIN (Basle University), who referred to the use of *x* rays after operation for cancer of the breast; he had used the method in the Basle University Clinic since 1906. He first treated cases of inoperable carcinoma, then operable recurrences and metastases, and finally carried out after-treatment on operated cases. The radiation was applied as soon as possible after operation, one Sabouraud dose being given through from 1 to 3 mm. of aluminium. Of twelve patients irradiated as far back as 1918, seven were

still alive in 1927 and enjoying good health; two had died of cancer, and three had succumbed to other maladies. The heaviest mortality in breast cases arose among patients with pure scirrhus, and he was inclined to endorse the prognosis of the late Dr. Hedinger, based on histological considerations, that scirrhus was the most dangerous, and medullary carcinoma the least dangerous, type. By *x*-ray treatment inoperable cases had been rendered operable, tumours had been mobilized, and gland metastases reduced and then removed. He believed intensive irradiation for cancer of the breast to be an error. Wintz, the inventor of that method, and other radiologists in Germany, had now returned to the use of the aluminium filter. Personally Professor Iselin said he had never been a believer in intensive treatment; he had never used the "carcinoma dose," and, in fact, so far as he could see, there was no such thing.

The thanks of the Section to the three visitors from abroad were expressed by Sir Percival Hartley and Dr. Clive Riviere.

WHAT IS COMPARATIVE MEDICINE?

At a meeting of the Section of Comparative Medicine of the Royal Society of Medicine, held on October 26th, Dr. O. Charnock Bradley, Principal of the Royal (Dick) Veterinary College, Edinburgh, read a paper entitled "What is comparative medicine?"

The word "comparative," he said, was capable of numerous interpretations, depending on the point of view of the interpreter. It was often considered to be synonymous with veterinary medicine. In the early days of history only one or two animals came within the consideration of veterinary medicine; in a pastoral country like Babylon, in the third millennium B.C., only sheep and cattle mattered, while in a military country like Rome the horse was of paramount importance. Nowadays, however, it concerned itself with a great variety of species, ranging from the horse to cage birds, suffering from different diseases which were not all intercommunicable and which presented different manifestations. Veterinary medicine, then, afforded ample scope for comparisons and could well claim to be recognized as comparative medicine, but it did not include man; and there was no justification for the exclusion of human medicine from comparative medicine, while there was abundant warrant for regarding both human and veterinary medicine as branches of a larger medicine. Both had a similar birth and growth. Both dealt with like problems by like means. Co-operation, long existing between both, had increased remarkably in recent years. There was, therefore, no sound reason for denying to them the collective title of "comparative medicine."

Comparative medicine, however, should have an even wider and more comprehensive connotation. Medicine had been built up gradually from materials imported, and these importations were most clearly evident in the foundations. The cell theory of Schwann and Schleiden, and the discoveries of Leeuwenhoek, were of fundamental importance, although neither worked initially in the interests of medicine. It was never possible to predict when and where the results of research in one branch of science would affect the problems of other branches. Moreover, no one could foresee what provinces of science might not have to be asked to assist in any particular problem. The daily work of the medical man and the veterinary surgeon was essentially analytical; and as it was always easier to analyse than to synthesize, they busied themselves with the relationship of things to man, rather than their relationship to each other. Accordingly this analytical method, invaluable as it was, must be checked and controlled by as extensive a general survey as possible.

Comparative medicine contained elements contributed from widely diverse sources; the physicist, the chemist, the biologist, the pathologist, all helped to accumulate the store of linked ascertained facts which the practitioner took for his use. Thus regarded, it was an instrument for the proper comprehension in true perspective of the problems of human and veterinary medicine.

With little reservation comparative medicine might be considered as standing to applied medicine in much the same relationship as do pure and applied science. Just as it was impossible to say when the truths of pure science might be applied, so was it impossible to predict when the facts of comparative medicine might form part of applied medicine. The work of Pasteur at first had no semblance of being an adjunct to medicine, and it progressed long and far before it became applied to veterinary medicine, and even longer before it touched human medicine. Comparative medicine, in brief, was a storehouse, be the provenance of its contents what it might, from which human and veterinary medicine could choose such things as were of possible application, and, taking them, give.

JAMES MACKENZIE INSTITUTE.

Physiology of the Stomach.

In a lecture at the James Mackenzie Institute for Clinical Research, St. Andrews, on the influence of diet upon the physiology of the stomach, Dr. John Boyd Orr pointed out that in much of the earlier work on the stomach there was a tendency to limit attention too exclusively to phenomena occurring in the stomach as if it were a semi-independent organ. The work of the past few years, however, has emphasized the close relationship and interdependence of the activities of the stomach and those of the other parts of the alimentary system. A derangement of function originating in any part of the alimentary canal tends to disturb the normal activities of the stomach, and many clinical symptoms located in, or at least referred to, the stomach have their origin in other parts of the system. In discussing the function of sensation, he distinguished between hunger and appetite. The former could be correlated with the contractions of the gastric muscle; the latter, however, depended not only upon the tonus of the muscle, but also upon stimuli received from sight, smell, taste, and memory. Instances were given of cases of perverted appetites in animals, and it was shown that these tended to occur on deficiency diets, and that in many cases the abnormal substance craved for was rich in the substances which were deficient in the diet. It was suggested that hunger might indicate a demand for quantity of food, and that appetite was, to some extent at least, an indication of quality rather than quantity.

With regard to the function of secretion, Dr. Orr said that a review of the most modern work indicated that perverted secretion, or excess or deficiency of gastric juice, was of less importance in the etiology of disease than had been formerly supposed. He regarded movement as the function which played the most important part in the maintenance of health and the causation of disease. Recent work had shown that the former conception of the acid-alkali control of the pylorus was untenable. The movements of the stomach, including those of the pylorus, were of the same nature as those of the rest of the intestine, following the law enunciated by Bayliss and Starling. The pylorus was seldom, if ever, in health completely occluded. While the general movement of the food was onward from the stomach to the intestine, there was a normal tidal flow between the duodenum and the stomach, and it was this tidal flow which regulated the degree of acidity in the latter organ. The chief factors which influenced movement were, normally, diet and the emotions. Experimental results showed that the composition of the diet had both an immediate and a remote effect upon movement, the remote effect being produced by an alteration in the circulating fluids of the body. One of the most interesting features of the results of feeding experiments with deficiency diets was not the gross disturbances in the body, but the disturbances of the function of movement in the intestine which led to lesions such as inflammation and ulceration, especially in the pyloric and caecal regions. Discussing the influence of the sympathetic nervous system on the gastro-intestinal movements, Dr. Orr expressed the opinion that emotions such as fear, anxiety, and anger, which stimulated the sympathetic, causing inhibition of movement and contraction of sphincters in the intestine, were an important factor in producing stasis in the lower part of the tract, and that this was often the beginning of permanent lesions.

Reviews.

THE BRIGHT CENTENARY.

THE third and fourth quarterly instalments of this year's volume of the *Guy's Hospital Reports*[1] are combined, and form a Bright Centenary number, containing a most interesting symposium. Professor W. S. Thayer's charming oration on Bright, which was printed in full in our issue of July 16th, appears here also, illustrated by three plates of his hero at different ages. This most complete study of a great pioneer bears evidence of much research, and the elaborate references constitute a valuable and most complete bibliography of Bright's published work. The actual site of the special wards called "clinical," in which so much of the observation and teaching of the physicians of Guy's Hospital was carried out, is described by Mr. H. L. Eason, C.B., superintendent of Guy's Hospital and its senior ophthalmic surgeon. Under the title "Chronic Bright's disease without albuminuria," used by F. A. Mahomed in his M.B. thesis at Cambridge in 1881, Dr. J. A. Ryle argues that the whole story of high blood pressure was constructed at Guy's between 1827 and 1881 by the pathological and clinical labours of Bright, Wilks, Gull and Sutton, and Mahomed. Three articles from well known authorities in Germany, France, and this country—Professor Ludwig Aschoff of Freiburg on "Disorders of the kidneys with symptoms of Bright's disease," Professor A. Lemierre of Paris on its outstanding syndromes; and Sir John Rose Bradford, President of the Royal College of Physicians, on uraemia—admirably express the appreciation of the medical world beyond the precincts of Bright's hospital.

Professor M. S. Pembrey reviews the work of Starling and his pupils on the process of secretion in the kidney; Mr. J. H. Ryffel sums up the practical bearing of tests for renal efficiency, pointing out that, apart from the question of determining the presence or amount of renal damage, the estimation of the plasma bicarbonate is more important than that of the blood urea in deciding about operation, and in his "Studies in Bright's disease" Mr. A. A. Osman continues his observations on the value of alkalis in the treatment of Bright's disease and its prevention. The development of the kidneys is described by Dr. G. W. Nicholson, and Mr. A. Ralph Thompson discusses the association of chronic Bright's disease with obstruction in the lower urinary tract. The incidence and pathological features of nephritis in early and in late syphilis, with references to the literature, are considered by Dr. G. B. Dowling, who illustrates the highly characteristic picture of the acute syphilitic nephritis seen in rare instances during the early stage—namely, during the first year after infection—thus contrasting with the nephritis that may arise in the latent period following the secondary stage and in the tertiary phase. The surgical treatment of chronic parenchymatous nephritis by decapsulation is favourably considered by Dr. John Fawcett, who prefaces his careful discussion by admitting that "the surgical treatment of chronic Bright's disease might well seem to emanate from the home of lost causes," but there is not any further reference to suggest that the senior of the two older universities is really responsible for Edebohl's operation.

Dr. H. C. Cameron writes wisely on nocturnal enuresis, and Dr. F. A. Knott pleads for more frequent bacteriological examination of the urine when clinically latent or intermittent septicaemia may appear probable. Dr. E. J. Greenwood, in discussing nephritis as a result of tonsillar sepsis, remarks on the much greater frequency of this sequence than of nephritis after acute otitis media, pneumonia, and skin sepsis, and from analysis of thirty-eight cases shows that in acute nephritis due to the tonsils their removal definitely improves the outlook by diminishing the risk of recurrent attacks and of chronic nephritis, but that when chronic nephritis has developed it is very doubtful if tonsillectomy will do any good. While admitting that there is not any mental syndrome specifically and solely related to Bright's disease, Dr. R. D. Gillespie gives an account of the forms that may occur, and makes some comments on the rarity of Bright's disease in the insane.

[1] *Guy's Hospital Reports*, Vol. 77 (Vol. 7, fourth series). Nos. 3 and 4, July and October, 1927. Edited by Arthur F. Hurst, M.D. London: The Lancet Limited. (Med. 8vo pp. 253-502; 4 plates, 12 figures. Price of this double number 25s. Annual subscription £2 2s. for volume of four parts; single numbers 12s. 6d.)

ATHLETICS AND THE HEART.

IF the reader will examine the evidence carefully for himself much information may be gathered from the book on *Heart and Athletics*,[2] by Drs. FELIX DEUTSCH and EMIL KAUF, translated into English by Dr. LOUIS WARFIELD. The authors have had the opportunity of examining in recent years and by modern methods many athletes of all types at the heart station in Vienna, and in this volume they present an analysis of their observations. The book is diffusely and confusingly written, it is difficult at times to be sure of the precise meaning of the text, and it is a pity in such a controversial subject that more attention has not been paid to the manner of expressing the conclusions. How far this is due to translation cannot be estimated, since the original German text has not been available for comparison.

In the conclusions at the end of the book it is said that the most important fact recorded is that "athletics brings about changes in the heart in a not inconsiderable number of cases which, in the present state of our knowledge, cannot be looked upon as harmless." Stated in this form the conclusion is not justified by the evidence given, for the numerous tables show, and the authors themselves admit, that the majority of athletes possess absolutely normal hearts. Less objection can be taken when it is stated, as on page 117, that "the normal man bears a marked loading of his heart without any change being produced in it; on the contrary the 'inferior-value' heart suffers an often increasing enlargement early, even with slight claims made upon it." In other words, if the true meaning of cause and effect be borne in mind, "athletics" is not a cause of cardiac enlargement. The authors bring forward no convincing evidence of enlargement of the healthy heart by effort, and such evidence as is given seems rather to support the view that, if a heart is enlarged as the result of exercise, then it is an unsound heart.

[2] *Heart and Athletics*. By Dr. Felix Deutsch and Dr. Emil Kauf. English translation by Louis M. Warfield, A.B., M.D. London: H. Kimpton. 1927. (5½ × 8, pp. 187; 19 figures. 10s. 6d. net.)

THE NORMAL CHEST OF THE ADULT AND THE CHILD.

The Normal Chest of the Adult and the Child,[3] written by Professor J. A. MYERS in collaboration with five other members of the teaching staff of Minnesota University, is a book whose appearance indicates the gradual advance that is being made in medical education. It represents the outcome of an attempt to teach the student something about the normal chest before confronting him with a pathological one. Many will remember the confusion of the first three months of clinical examination, when we were faced with a medley of heart and lung cases, and were expected to sort out for ourselves the pathological from the normal. Interesting work it was, and stimulating to the mind; but it was not good teaching. That position is now changed, and both in this country and in America the student is being taught the standards of the normal chest by means of auscultation, radiography, and vital capacity measurements.

The book before us is excellently suited to those who have charge of this branch of teaching. After dealing with the anatomy and physiology of the heart and lungs, it goes on to electro-cardiography, to the *x*-ray examination of the chest, to the correlation of body weight and chest measurements, to the developmental anatomy of the thoracic organs,

[3] *The Normal Chest of the Adult and the Child*. By J. A. Myers, in collaboration with S. Marx White, R. E. Scammon, A. T. Rasmussen, C. A. Stewart, George E. Fahr. With an introduction by Elias P. Lyon. London: Baillière, Tindall and Cox. 1927. (Med. 8vo, pp. xv + 413; 141 figures. 22s. 6d. net.)

and to the physics of percussion and auscultation. The information is fairly full; it is perhaps a pity that the reaction of the heart and lungs to exercise is not more fully considered, and that the estimation of basal metabolism is not included; but no doubt the editor has sufficient reasons for restricting the book to its present limits.

THE FLUSHINGS OF THE MENOPAUSE.

In a monograph of fifty odd pages entitled *The Flushings of the Menopause*[4] Dr. Hannan records his investigations and discusses possible lines of treatment. Its chief merit is that it is based on the personal observation of 131 women, of whom 73.3 per cent. complained of some degree of flushing, and 26.7 per cent. did not. The distribution, character, duration, and frequency of the flushings are noted, together with any symptoms associated with or immediately preceding or succeeding the flushing.

Flushing is regarded as a "vasomotor crisis" and observations are given, unfortunately only in four patients, on the changes in blood pressure and pulse rate before, during, and after flushing, and an attempt is made to correlate the intensity of the crisis with the age of the patient, the character of the menstrual changes, and the psychological condition of the patient at the menopause.

The material at the author's disposal is much too small for anything definite regarding the nature and treatment of menopausal symptoms to be based on it, and scarcely warrants the conclusions summarized at the end of the monograph. His work will, however, be found suggestive and useful.

A COMMEMORATIVE VOLUME.

Volume XVIII of the Italian archives of surgery[5] is dedicated to Professor Raffaele Bastianelli in celebration of his having attained the twenty-fifth year of his professorship, and it contains nearly one hundred articles of surgical and pathological interest, written by colleagues and admirers in his own country and abroad. A few only of the contributions can be referred to here. Professor Arcangeli writes on "osteomalacia," distinguishing the disease from senile osteoporosis and from the so-called starvation osteomalacia. True osteomalacia he holds to be an infective disease caused by the diplococcus discovered by Mopurgo in 1890. Its infective nature is further shown by its frequency in some localities and its rarity in others, by its appearance in the form of epidemics, and by the frequent occurrence of several cases in the same house. Osteomalacic patients, he states, mostly have rickety children or have lived with osteomalacics or rickety children. The infection is supposed to be transmitted through the urine and faeces, and one of the reasons why women are especially liable to the disease is said to be their frequent contact with rickety children. Fehling's theory that the disease is caused by disordered ovarian function and curable by ovariotomy is rejected by Arcangeli, who considers that any effects that follow the operation are due to the chloroform inhalation rather than the operation itself. According to the author, true osteomalacia can be almost always cured by inhalation of chloroform. It is necessary that the narcosis induced should be profound, as if for a major operation, and that it should be continued for three-quarters of an hour or an hour. Arcangeli has treated 150 patients by this means with almost uniform success. Professor Leriche contributes a paper on section of the rami communicantes for relief of painful affections of the extremities, reference being made chiefly to painful stumps and to diffuse traumatic neuralgias. In Raynaud's disease and erythromelalgia he considers that periarterial sympathectomy is the best treatment, 85 per cent. of cures having occurred in his 57 cases. In the various forms of juvenile arteritis obliterans he finds that both ramisection and periarterial sympathectomy are ineffective; while in scleroderma periarterial sympathectomy and ramisection combined give good results. In angina pectoris he regards ramisection of the brachial plexus as an essential part of the treatment, combined with section of the sympathetic trunk above the inferior cervical ganglion and of the rami communicantes of the vertebral nerve. With regard to painful stumps, he distinguishes two types. In one the vasomotor disturbance is peripheral and objective (oedema, cyanosis, trophic changes) and the pain is supportable; such cases may generally be cured by periarterial sympathectomy. In the second type the pain is intolerable, diffuse, radiating farther with the lapse of time; and in four of such cases congestion of the corresponding region of the cord was observed. No peripheral operation of any kind gives permanent relief in this type, although division of the posterior roots may give a partial or temporary relief. Ramisection, on the other hand, which was performed in four cases, has given immediate and complete relief, persisting for seventeen, five, four, and two months respectively, and the author regards it as the operation of choice. Ramisection was found to be equally satisfactory in those distressing cases in which severe neuralgia follows some insignificant traumatism — the so-called ascending traumatic neuritis. These cases are at present held to be incurable, but Leriche found that ramisection gave complete and apparently permanent relief in three cases. Sir Berkeley Moynihan contributes a valuable article on perforating gastric and duodenal ulcers, their diagnosis and treatment.

[4] *The Flushings of the Menopause.* By John H. Hannan, M.A., M.D., B.Ch.Cantab. London: Baillière, Tindall and Cox. 1927. (5½ × 8½, pp. viii + 52. 3s. 6d. net.)

[5] *Archivio Italiano di Chirurgia.* Vol. XVIII. Scritti in onore di Raffaele Bastianelli. Bologna: L. Cappelli. 1927.

MEASLES.

In the preface to their book on measles[6] Drs. Robert Debré and Pierre Joannon are careful to state that it is not to be an exhaustive study of measles, but merely an exposition of the facts connected with the epidemiology, immunology, and prophylaxis of the disease. Both writers, particularly Dr. Debré, are well fitted to write such a work, as they have for some years taken an active part in the campaign against measles and, as will be seen from the bibliography to the volume, have made several contributions to the literature of the subject.

The book is divided into three parts, dealing with the epidemiology, immunology, and prophylaxis of measles respectively. In the first part the writers discuss the mortality from measles, giving tables showing the mortality in ten different European countries, the factors of mortality such as age, sex, previous health, epidemic constitution and environment, and the social factors in the high mortality from the diseases in the working classes. The second part, which deals with immunology, contains two chapters, the first of which is concerned with susceptibility to measles during and after the first year, special attention being paid to the subject of congenital measles. In the next chapter an account is given of the contagiousness of measles at various stages of its course and of the immunisins contained in the blood. The third part, which forms the most important section of the book, deals with prophylaxis. The writers begin with the study of general methods, and then go on to discuss prophylaxis by convalescent serum, or the whole blood or serum of those who have had measles some time previously, such as the parents and, finally, active immunization against measles by modification of a method first introduced by Francis Home in 1758. An extensive bibliography is appended.

The book contains an admirably lucid exposition of the recent work on the aspects of measles described. We must, however, take the writers to task for giving to an imaginary "Minn en Angleterre" (p. 220) the credit for testifying to the prophylactic value of convalescent serum which, to judge from the dearth of literature, has so far not been employed in this country in the prophylaxis of measles.

[6] *La Rougeole: Epidémiologie—Immunologie—Prophylaxie.* Par Robert Debré et Pierre Joannon. Préface du Professeur Léon Bernard. Paris: Masson et Cie. 1926. (Med. 8vo, pp. vii + 288; 35 figures. 35 fr. sans majoration.)

PATRICK GEDDES AND TOWN PLANNING.

Many members of the British Medical Association who attended the Annual Meeting in Edinburgh last July must have noticed a tall building nearly at the top of Castle Hill, upon which is mounted an observatory. In a book

entitled *The Interpreter, Geddes*,[7] written by Miss AMELIA DEFRIES, we learn that this tower was once the habitation and laboratory of Patrick Geddes, sometime professor of botany at St. Andrews University, and now professor of sociology and civics at Bombay. The book under review purports to be a life of Geddes and an exposition of the principles for which he lives and works.

Geddes has many sides. He was a biologist first, and with Professor Arthur Thomson wrote some works on the evolution of sex that are well known and much read. But he ranges outside the strict limits of theory into the fields of practical sociology, into statistics, economics, the dramatization of history, war, civics, the vexed coal crisis, and, most of all, into town planning. And who shall say that these divergencies are outside the field of biology? Geddes is without doubt an eccentric genius; geniuses are often eccentric, and perhaps they are entitled to be so, for they are outside law and a law unto themselves. But, alack! his biographer has caught too much of his eccentricity, so that it is with difficulty that the reader can discover from her book any clear picture of her revered master; she claims for him that he is "The Interpreter," but she fails to be an interpreter of him. Nevertheless, the book is one of interest. Town planning is certainly the chief love of Geddes, and in that field he has done some remarkable work. The design for the University of Jerusalem, for which he and Mears were responsible, and of which there is an illustration in this book, would alone give him claim to distinction. But he has served in wider fields, notably in India, where he prepared many reports on town planning.

Perhaps one of the most amusing parts of the book is the story of the town planning exhibition in Ghent in 1913. Geddes took part. The visitor sought out his exhibit on the eve of the opening. There was found,

"the gallery of the vast German Pavilion magnificently arranged. Every photograph was a fine one, every plan splendidly drawn; and each exhibit was not only well framed and glazed, but usually in good taste. Underneath each was a clearly printed label in gold and black; the whole was well hung and the wall covering artistic. Thus the gallery presented a unity and harmony which heightened the efficiency manifest throughout . . . Guardians in German uniform stood at each end of the building, who were able to reply intelligently to all my questions."

But no one knew where was Geddes's show, except these German officials. When at length the right place was discovered,

"I stumbled over scaffolding and fell into a litter of maps, plans, and prints scattered over the floor. Around was a vast gallery, partitioned into smaller rooms of different sizes, 'papered' with jute sacking, on which were roughly pinned plans, photographs, and incomprehensible-looking diagrams. In every room masses of material were scattered on the floor with endless piles of apparently disordered notes . . . among them some realistically horrible representations of war . . . Hearing voices I ventured further, and there—on his knees, working in shirt-sleeves and at high pressure—was the slim, agile, bearded figure of the masque."

Yet Geddes received the International Award, and not the Germans.

The book has a foreword by Rabindranath Tagore; a preface by Lewis Mumford, who knows and tells what Geddes has done; and a very interesting introduction by the late Israel Zangwill, which ends with the words: "We are citizens of no earthly city. That is not to say we should be content to be citizens of mean cities."

A GUIDE TO BEGINNERS IN GENERAL PRACTICE.

To justify his choice of a career the general practitioner must acquire speedily some business knowledge, the faculty for orderly arrangement of his life, and an extensive and varied acquaintance with human psychology, especially of the human sick. No teaching school has ever yet considered it part of its duties to instruct its students in these essentials, probably because teaching staffs know nothing of the matter. Dr. W. S. SYKES, though comparatively young in practice, endeavours to enlighten the beginner by his *Manual of General Medical Practice*.[8]

Dr. Sykes writes in a pleasant and readable style; evidently he takes the trouble, so often neglected by general practitioners, of keeping records of his patients; he is interested in analysing his results, and he can be quite forcible in defending the honour of the general practitioner. When he went into practice he had no idea what influenza was like. Osler's *Medicine* had given him three and a half pages, which he found unsatisfactory, about influenza to forty-six about typhoid. Yet he has had to treat 112 cases of the former disease for every enteric case. He disagrees with Osler that the thermometer is the most trustworthy guide in the diagnosis of appendicitis, and relies on a rising pulse rate with increasing toxaemia. Dr. Sykes resents the tendency of the official to attribute puerperal fever to infection by the doctor, and he challenges highly placed medical officials to polish up their knowledge of midwifery and conduct a series of confinements themselves. He considers that the Royal Commission on Venereal Diseases estimated the number of those infected with syphilis far too high, and that more reliance can be placed on the figures for unselected fragments of the population, such as form the clientele of a general practice, than those derived from bodies of lunatics, convicts, or specialized groups. Thus, amongst 2,250 individuals in his practice the prevalence of syphilis was 0.22 per cent. instead of 10 per cent. He admits that his figure is too small, but he points out that a proportion of 10 per cent. would mean that for every case recognized he had overlooked forty-nine. Dr. Sykes humbly submits that his powers of diagnosis are not as bad as that. The experience of most general practitioners would probably support his views.

While much of Dr. Sykes's book will appear mere truism to established practitioners, to the student starting in practice its many suggestions should be invaluable.

NOTES ON BOOKS.

A NEW textbook of clinical ophthalmology[9] has been written by two French doctors, Messrs. ROCHON-DUVIGNEAUD and DESCOLA. For somewhat over the first half the book is arranged on the customary systematic plan, but for the rest it is composed of a series of monographs of a distinctly attractive and illuminating order. There are chapters on the innervation of the eye and its disorders, on congenital anomalies, on tumours and pseudo-tumours, on the pathology of the eye and its relation to general pathology, on ocular medication and general therapeutics, on injuries to the eye and their medico-legal aspects, and the determination of percentages of invalidity. The book is well written and well printed. The arrangement of the paragraphing is good; there are ample spacings, so that the eye of the reader is not wearied with a never-ending succession of unrelieved grey pages. But the illustrations are poor, judged by our standards; they are few in number, and the representations of fundus drawings are such as might be considered likely to deter anyone from attempting to see their originals. The volume is of cumbersome shape—somewhat like Bradshaw's railway guide, squat and heavy.

Sir W. ARBUTHNOT LANE has written a little book with the title *Secrets of Good Health*.[10] It appears for the most part to be a collection of articles which have appeared in the *Daily Mail* on matters of health interest. The book deals with a variety of topics in a brief and vigorous manner. The author claims that "These hints will explain in simple, non-technical language how and why the human organism benefits or suffers from the various physical influences to which it is subjected under the complicated conditions of modern life and diet." Much attention is given to food and food values, and notes by other writers on these subjects are included. Many of the opinions expressed are individual, but this adds emphasis to the writing. One suggestion seems to us somewhat surprising. The author very properly animadverts upon the lack of sufficient lavatory accommodation, especially for women, and upon the ill effects of constipation. But he appears to be altogether dissatisfied with one good evacuation of the bowels a day, and suggests that in the natural state defaecation would follow each meal, and that this habit should be cultivated. "If suitable foods are eaten the bowel evacuates a quantity of

[7] *The Interpreter, Geddes: the Man and His Gospel.* By Amelia Defries. London: George Routledge and Sons, Ltd. 1927. (Demy 8vo, pp. xiii + 333; illustrated. 10s. 6d. net.)

[8] *A Manual of General Medical Practice.* By W. Stanley Sykes, M.A., M.B., B.Ch.Cantab., D.P.H.Leeds, etc. London: H. K. Lewis and Co., Ltd. 1927. (Cr. 8vo, pp. xii + 216. 7s. 6d. net.)

[9] *L'Ophthalmologie en Clientèle.* Par A. Rochon-Duvigneaud et P. Descola. Comment guerir? Bibliothèque des Praticiens. Paris: Norbert Maloine. 1927. (5½ × 7½, pp. 907; 83 figures. 55 fr.)

[10] *Secrets of Good Health.* By Sir W. Arbuthnot Lane, Bt., C.B. London: William Heinemann (Medical Books), Ltd. 1927. (Cr. 8vo, pp. viii + 152. 3s. 6d. net.)

material after each meal, proportionate in bulk to the amount of food taken." There may be persons to whom such a sequence of events would prove an advantage; but if the proposition thus stated be universally true, then there must be many who will say: "Let me eat unsuitable foods, and leave me to my one good action a day."

The story of the naval operations in the South Atlantic and Pacific in 1914, as told by Lieutenant Commander John Irving, is a thrilling romance of the sea.[11] Not that it is the author's intention to be picturesque. On the contrary, he writes seriously, with the apparent, though not expressly stated, object of bringing into relief certain fundamental requirements in naval armament, and the age-old chivalry of the sea that ceased with the advent of the submarine. The demands and estimates of the navy were often, we are told, the shuttlecock of political opportunism, and invariably suffered. Lack of cruisers, intensified by their withdrawal—in subordination to military whims of the moment—to form escorts for expeditions set on foot prematurely for territorial acquisitions, exposed our maritime trade—our vital and most vulnerable point—to attack by the enemy. In carrying out the task of freeing the trade routes, area by area, from this menace, Cradock's heterogeneous and inferior squadron was sent from the South Atlantic, by "a stupendous error of the Admiralty," to oppose the homogeneous and formidable squadron of von Spee in the Pacific, and met its fate gallantly off Coronel. Then the wheel of fortune turned, and von Spee's squadron, on entering the Atlantic, met its fate, equally gallantly, off the Falklands. The chivalry of the sea was upheld by both. In the author's narrative of the latter battle an incident, reminiscent of one in the history of the Peninsular war, is related. "As though to bring a breath of peace and tranquillity to a scene of blood, a full rigged ship was observed to pass down the lines with her sails full and bellying to the slight breeze. What she was doing there no one knew." In this battle it comes as a surprise to be told that the British casualties were only ten killed and fifteen wounded, while the German losses are estimated at 2,263.

Dr. R. G. Cochrane, medical adviser to the Mission for Lepers, has prepared a pamphlet on the symptoms, diagnosis, and treatment of leprosy for the use of those who have had no opportunity for special study of this disease. The pamphlet is clearly written and the subject is approached from the practical standpoint, so that it can be strongly recommended to those who desire a short and up-to-date summary. It can be obtained from the Mission to Lepers, 33, Henrietta Street, W.C.2. On August 27th (p. 362) we referred to a recent pamphlet by Dr. Cochrane entitled *Leprosy in India: a Survey*.

The anonymous little book entitled *The Invert and His Social Adjustment*[12] is the work of a cultivated layman, himself the victim of the anomaly on which he writes. The book is intended, as Mr. R. H. Thouless says in the introduction, for two classes of readers—namely, for those who are themselves inverts, to whom the writer gives excellent advice, and also for the average man who has mistaken views about the nature of sexual inversion. The work is an interesting human document and well fulfils the purpose with which it was written.

[11] *Coronel and the Falklands.* By John Irving, Lieutenant Commander, R.N. (ret.). London: A. M. Philpot, Ltd. 1927. (Cr. 8vo, pp. 247; illustrated. 6s. net.)

[12] *The Invert and His Social Adjustment.* By Anomaly. With an introduction by Robert H. Thouless, M.A., Ph.D. London: Baillière, Tindall and Cox. 1927. (Fcap. 8vo, pp. xxxii + 160. 3s. 6d. net.)

PREPARATIONS AND APPLIANCES.

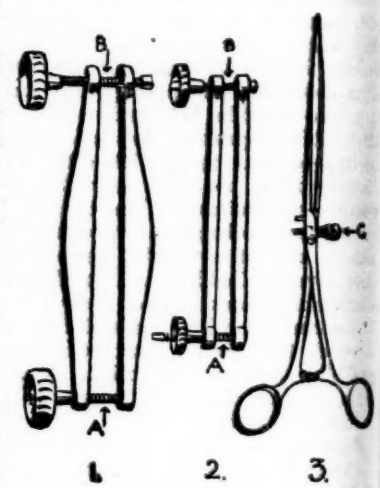
Clamps for Gastrectomy and Gastro-enterostomy.

Mr. C. W. Cathcart has devised two clamps for abdominal surgery, which he finds are very satisfactory. He writes:

Both clamps are of similar construction. Each consists of parallel steel bars approximated by a screw at each end. This mechanism allows a delicate adjustment of pressure, which can be increased at will to a crushing force. The advantage of having the pressure thus under control is especially important in the operation of gastro-enterostomy. The ordinary type of forceps, which moves on a pivot, has been found to injure the gastric mucous membrane by unequal pressure at certain parts.

1. *The Gastrectomy Clamp.*—This consists of two strong steel blades shaped as shown in the illustration. They are eight inches long, and a quarter of an inch broad where their surfaces meet. The lower blade (that is, on the reader's right) has fixed to it a short rod "A," which is tapped with a screw. At the other end of this blade there is an oval hole into which the oval head of rod "B" fits; "B" is therefore detachable, but cannot rotate in its socket. The upper blade (that is, on the reader's left) has a hole at each end which allows the rods "A" and "B" to pass easily through. Each rod is supplied with a large screw nut by which the blades can be pressed together.

Mode of Use.—After the stomach has been prepared for resection "B" is removed and the nut of "A" loosened. The free ends of the blades are passed above and below the stomach at the site chosen for resection. "B" is then inserted through the holes in the blades, and its nut is fitted on to it. The blades are then pressed together by screwing down the nuts, which are turned from time to time as the tissues are compressed. When no further pressure can be made the nuts are loosened and the blades allowed to separate. The clamp is then used as a tourniquet as follows. It is moved about 1½ or 2 inches nearer the fundus of the stomach, and the nuts are carefully screwed down till the stomach is compressed sufficiently to prevent haemorrhage or the escape of gastric contents, and no more. The crushed portion of the stomach is then divided and sewn up. "B" is then removed, and the clamp withdrawn. The parts beyond the affected portion of the stomach or duodenum are afterwards dealt with, and the operation is completed as may be required.



2. *The Gastro-enterostomy Clamp.*—This is a lighfer form of the gastrectomy clamp. The blades are much lighter, because they are needed only for holding the required fold of stomach wall. They are grooved longitudinally. At the proximal end of the blade, near "A," a small block of steel is attached. It is pierced with six small holes, tapped with a screw, about a quarter of an inch apart. The intestinal forceps (3) which are required for this clamp are of the usual light type, with the following addition: A small block of steel is fastened under one of the blades just beyond the pivot. To this two small pins are attached, projecting to the left; one is plain, and the other, "C," is screwed to fit the holes on the clamp.

Mode of Use.—Having exposed the part of the stomach wall which is to be connected with the duodenum, pass a catgut needle (round point) with a thick strand of silk or catgut into the muscular coat of the stomach at each end of the intended line of incision into the stomach. Draw each thread through the wall, leaving about four inches of double thread free. Knot the ends together, and cut off the rest along with the needle. This leaves a loop of catgut at each end of the intended line of incision. Open the blades of the clamp and gently draw the selected part of the stomach wall between them by means of the catgut loops. Then approximate the blades to hold the fold securely, and no more. Now grasp the selected portion of the jejunum lightly with the intestinal forceps and lay the forceps alongside of the clamp which holds the stomach. Adjust the forceps to the clamp and fix the two together by screwing the rod with the milled head, "C," into the hole which most suitably adapts the intestine to the stomach. Remove the catgut loops and proceed with the gastro-intestinal anastomosis. When the suturing is complete release the intestinal forceps, first from the clamp, and then from the intestine. Lastly, having screwed off the nut, remove "B," and withdraw the blades of the clamp.

The makers are Messrs. Smith, Hurford and Drysdale, 21, Lauriston Place, Edinburgh.

Ergotoxine.

We have received from Messrs. Burroughs Wellcome and Co. a sample of ergotoxine ethanesulphonate. This is a new preparation of the alkaloid ergotoxine, which is one of the principal alkaloids of ergot. Ergotoxine was introduced by Messrs. Burroughs Wellcome and Co. many years ago, and sold by them as ergotoxine phosphate. The recent discovery of the allied alkaloid ergotamine has stimulated interest in the active principles of ergot. Ergotamine and ergotoxine differ in their chemical formula, but appear to have the same qualitative pharmacological action. The evidence available suggests that the intensity of their actions also is similar. It will be of interest to see if further research reveals any differences in the action of these alkaloids. It is satisfactory that the original alkaloid ergotoxine is now available in a form which, the makers state, has various advantages over previous preparations.

Nova et Vetera.

A SIXTEENTH CENTURY LONDON PHYSICIAN'S BOND, 1585.

I was fortunate in acquiring this document among a bundle of ancient deeds, most of which were of early date and none of them of a later date than that of Queen Elizabeth. The text is as follows:

This Indenture made the thirde day of Marche in the eighte and twentith yeare of the raigne of Our Soveraigne Lady Elizabeth by the grace of God Quene of England ffraunce and Ireland Defendor of the ffaithe etc. Betwene William deLaune of London Doctor in phisic on th'one partie And Adam Rayneshawe Citizen and Carpenter of London on th'other partie Witnesseth that whereas the said Adam Rayneshawe by one recognizaunce of the nature of a statute staple bearringe date the day of the date of theis presents Taken and acknowledged before the righte honorable Sr. Christofer Wraye Knight Lorde Cheife Justice of the Quene's Majesty's Courte comonlie called the King's Benche at Westminster to holde and standeth bounde unto the said William deLaune in the somme of Thre hundreth pounds of lawfull money of England Payable as by the same recognizaunce more fully at lardge doth and may appere. Nevertheless the said William deLaune for him his heires executors administrators and assignes and for every of them doth covenante and graunte to and with the said Adam Rayneshawe his heires executors administrators and assignes and every of them by theis presents That if the said Adam Rayneshawe his heires executors administrators or assignes or any of them do and shall well and truly paye or cawse to be paied to the said William deLaune his executors administrators or assignes Att or within the now dwellinge howse of the said William deLaune called the signe of the thre starres scituate and beinge within the prescincte of the Blacke ffriers nere Ludgate in London the somme of one hundreth and flowre score poundes of lawfull money of England in manner and forme folowinge (that is to say) On the flowrth day of Marche which shalbe in the yeare of our Lorde God One thowsand ffyve hundreth flowre score and sixe flyftene pounds and on the flowrth day of Marche that next and ymediatlie folowinge which shalbe in the yeare of our Lorde God one thowsand fyve hundreth flowre score and seaven One hundreth threscore and ffyve poundes THAT THEN the said recognizaunce shalbe clerelie voyde and of none effecte. AND IF defaulte shall happen to be made in paymente of the said some of one hundreth and flowre score pounds or any parte or parcell thereof contrary to thorder forme and place aforedeclared. THAT THEN the said Adam Rayneshawe for him his heires executors administrators and assignes and for every of them doth covenant and graunte to and with the said William de Laune his heires administrators executors and assignes by theis presents That the said recognizaunce shall stande abyde and remayne in full strength and vertue. AND FURTHER the said William de Laune for him his heires executors administrators and assignes doth covenant and graunte to and with the said Adam Rayneshawe his heires executors administrators and assignes by theis presents That he the said William de Laune his executors administrators or assignes ymediatly after that full payment shalbe had and made of the said somme of £180 in forme aforesaid according to the true intent and meaninge of theis presents shall and will upon the lawfull request or demaunde of the said Adam Rayneshawe his executors administrators or assignes therefore to be made not only delyver or cawse to be delyvered to the said Adam Rayneshawe his executors administrators or assignes At or within the forsaid now dwellinge howse of the said William de Laune the forsaid recognizaunce or statute staple to thintent to be cancelled and made voyde But also at the costs and chardges of the said Adam Rayneshawe his executors or assignes shall and will At or in the office of the clarke of the staple for the tyme beinge to be holden and kepte in London gyve his or there consent that a vacat or entrey shall or may be there entered (if nede shall so require) As by the said Adam Rayneshawe his executors or assignes or by his or there learned counsell shalbe reasonably devised whereby it may there appere that the same recognizaunce or statute staple is dischardged and made voyde. In witness whereof the parties first above named to these indentures sounderly have set their seales the day and yere above written. 1585.

The seal is missing, but on the tag is written, in another hand: "Sigillatum et deliberatum in presencia Roberti Bahere feltmaker et mei Willelmi Sesche (?) serivener."

An account of William de Laune will be found in Munk's *Roll of the Royal College of Physicians* (second edition, vol. i, p. 84. From this source we learn that he was buried at St. Anne's, Blackfriars, on February 19th, 1610.

DeLaune's son, Gideon, was a prominent man in the early days of the Apothecaries' Society, and he had other children, as appears from a study of his will, an abstract of which is as follows:

(P.C.C., Wood, 23). William deLaune, preacher of the word of God and Phisician. 27th November 1610.

To be buried nere unto my late deere wife yf it be possible. In forme of sale to Gideon deLaune my eldest sonne all my messuages landes etc. (except what I give to my sonne Paule deLaune) in precinct called the blackeffryers nere Ludgate of London, which I late purchased of Sr. William More, and the said Gideon in 6 months to pay the following—Poore of ffrenche churche in London, £4. Poore of blackeffryers and the churches of Norwiche and deepe to every one of them 20/ [this probably means 20/- to each place]. My poore kindred beyond the sea, £6 to be administered by my son Nathaniel deLaune. Sister in law Mary Desloges widow of Cornellis Tauce [? Tance] £3. Sonne Paule for the good service he hath done me, the newe house which I built with the greate courte and the house of office therein, and also one of the chambers which he shall chose ready furnished, and also the Apothecarie stuffe and furniture in the said newe house—paying unto Gideon deLaune his eldest brother £50. Said sonne Paule deLaune those £50 mentioned in a bond under the names of Mr. Burt, Mr. Hartley and Mr. Boulton, as also my silver guilt pott of a pynte for a remembrance. Abraham deLaune sonne and heire to said Gideon deLaune the great silver salt seller. Residue of goods as of the £650 which arise of the sale of my howses equally to my sons, eldest son Gideon, and sone Peter, Nathaniel, and Paule, and to Henry deLaune sonne and heire to Isaac my sonne deceased, who for his marriage received £100. And to my daughters, Sara, Ester, and Elizabeth. As for my son-in-lawe Peter Chambleyn, my will is he repaire the entrye of my howse wherein he nowe dwelleth as it was when he first entered as he ought to by judgement of honest men, before he receive any benefit. And since my daughters have had more than my sonnes as well at their marriages as at their mother's decease by her own meanes, each sonne to have £5 extra. Executors, son Gideon deLaune and Nathaniel Mary my son-in-lawe. And if Gideon refuses to execute, then his legacies to my son Peter, and if he refuses then to my son Nathaniel, and if he refuses then to my son Paule. In which case I will only £150 to son Gideon. Witnesses. Robt. Andrewes. Martin Browne. Roger Langton.

The will was proved on March 12th, 1610 (O.S.), and administration was granted to Gideon de Laune and Nathaniel Mary. The deceased is spoken of as of the "parish St. Anne in le Blackffriars, London."

From Venn's *Alumni Cantabrigienses* we learn that Peter was of Peterhouse; D.D., and Pastor of the French congregation at Norwich in 1647. Paule was of Emmanuel, and an account of him will be found in Munk's *Roll* (vol. i, p. 170). Abraham and Henry de Laune both figure in Venn's book; the former was of Emmanuel College and died in January, 1637/38. The latter was of Caius College, a son of Isaac de Laune, M.D., a Frenchman; he was educated at a school in Norwich. (Pedigree in *Visitation* of London, 1634.) There was evidently a Norfolk connexion about this family, and I regret that I have had no opportunity of consulting the history of that county.

It is satisfactory to find that son Gideon did not renounce probate; let us hope also that the recalcitrant son-in-law made good the defect in the "entrye of his howse." Can he have been related to the famous Peter Chamberlen? I like to think that "sonne Paule" got "the newe howse," possibly that of the "thre starres" mentioned in the bond.

I am indebted to Mr. John Gibbons for the abstract of the will. The original deed has been deposited in the library of the Royal Society of Medicine.

R. R. James.

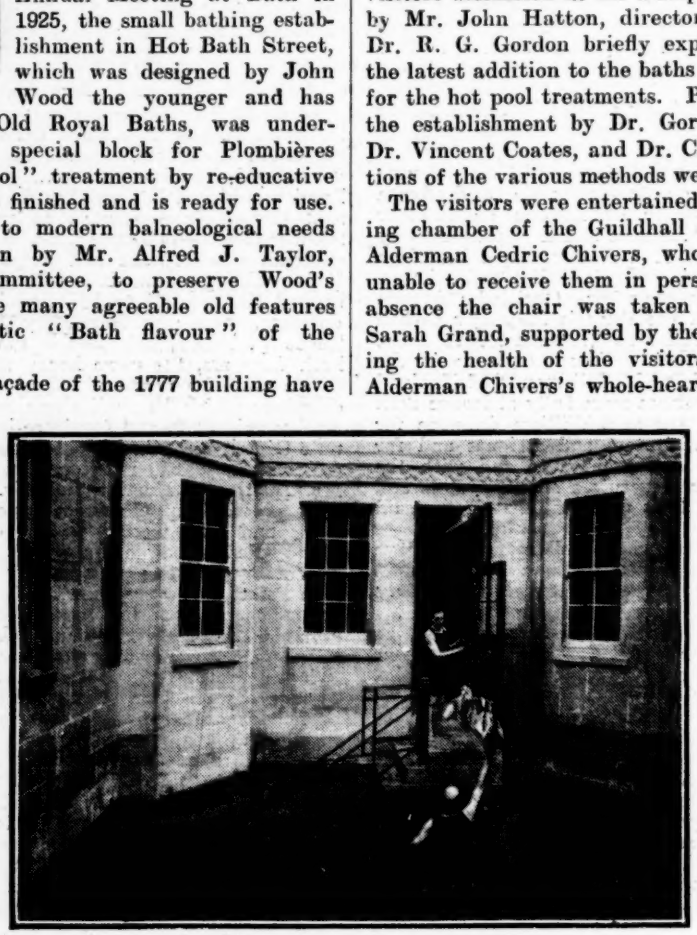
THE WATERS OF BATH.

RECONSTRUCTION OF THE OLD ROYAL BATHS.

The Old Royal Baths.

WHEN the British Medical Association held its memorable Annual Meeting at Bath in 1925, the small bathing establishment in Hot Bath Street, which was designed by John Wood the younger and has long been known as the Old Royal Baths, was undergoing reconstruction as a special block for Plombières douches and for "large pool" treatment by re-educative exercises. It has now been finished and is ready for use. In adapting this building to modern balneological needs every care has been taken by Mr. Alfred J. Taylor, architect to the baths committee, to preserve Wood's ingenious planning and the many agreeable old features that give the characteristic "Bath flavour" of the eighteenth century.

The main lines and the façade of the 1777 building have been retained and freed from some later excrescences. In the centre of the block is the large pool, supplied direct from the neighbouring thermal spring, and equipped for the under-water treatment of spastic and flaccid paralyses by voluntary and controlled exercises, a method which has been in use at Bath on a smaller scale in the Cross Bath for some time past. The object is to facilitate active and passive movements in a medium which supports the limbs, relaxes muscular spasm, and eases pain. For this purpose an ample supply of hot water is essential.



Re-educative Treatment in the Hot Bath.

John Wood's beautiful little pool bath has thus been carefully restored, the only change in its architectural features being the addition of a glass roof, which in favourable weather can be opened to the sky. A lifting and travelling apparatus (shown in our illustration) has been installed for conveying helpless patients from the dressing room to the hot mineral water bath, supported by slings. There are also submerged parallel bars to assist patients in the voluntary walking exercises which form an important part of the re-education treatment.

Behind the pool are six suites of rooms admirably equipped for the Plombières intestinal lavage and Tivoli douche treatments. The increasing employment of the Plombières method at Bath, at first for colitis, and now also in rheumatic diseases, has called for the provision of more and more accommodation and the training of a staff of expert attendants. Concentration of this method of treatment in one building, specially designed and fitted for the purpose, should prove a considerable advantage, and incidentally it releases some good rooms in the Royal Baths for vapour treatment.

The reopening of the Old Royal Baths, on Saturday, October 22nd, coincided with the annual meeting of the British Orthopaedic Association at Bristol, and a large party of orthopaedic surgeons from all parts of the country travelled from Bristol to Bath to inspect the new bathing equipment and the orthopaedic hospital at Coombe Park in connexion with the Royal United Hospital. At noon the visitors assembled in the Pump Room, and after a welcome by Mr. John Hatton, director of the hot mineral baths, Dr. R. G. Gordon briefly explained the purpose of this, the latest addition to the baths of Bath, and the indications for the hot pool treatments. Parties were then shown over the establishment by Dr. Gordon, Mr. W. G. Mumford, Dr. Vincent Coates, and Dr. Charles Curd, and demonstrations of the various methods were given.

The visitors were entertained to luncheon in the banqueting chamber of the Guildhall as the guests of the mayor, Alderman Cedric Chivers, who, to the regret of all, was unable to receive them in person owing to illness. In his absence the chair was taken by the mayoress, Madame Sarah Grand, supported by the deputy mayor. In proposing the health of the visitors the mayoress referred to Alderman Chivers's whole-hearted interest in orthopaedics and his work for the hospitals in Coombe Park. Mr. H. A. T. Fairbank, president of the British Orthopaedic Association, in his reply, recalled the long history of Bath, with its world-famous springs and its great name for hospitality, and welcomed the presence that day of Dr. F. G. Thomson, whom so many of them missed two years ago when illness prevented him from presiding over the Bath meeting of the British Medical Association. They were also pleased to have among them their colleague, Mr. Walter Mumford, who had deputized so admirably for Dr. Thomson on that occasion. Mr. Fairbank undertook to send a telegram of good wishes to Alderman Chivers, and in proposing the health of the mayoress spoke of Madame Sarah Grand's deep concern for the welfare of crippled children. The proceedings ended with a congratulatory speech on behalf of the French spas by Dr. Chesnau of Aix-les-Bains.

The new extension of the hot mineral baths was formally opened later in the afternoon by Councillor C. H. Hacker, deputy mayor and chairman of the baths committee, who said that with this second reconstruction of the Old Royal Baths—150 years after the first reconstruction by John Wood the younger—the modernized Bathing Establishment of Bath might be considered complete. In declaring the building open he acknowledged very warmly the interest shown by the local medical profession in the improvements that had been carried out, and their constant co-operation in promoting the great work of Bath as a centre of healing.

It is always pleasant to revisit Bath at any time of the year, but particularly on an occasion such as this, when the old city gives further proof of its ability to keep up with the ever growing demands of medical science. The reconstruction of the Old Royal Baths provides much needed additional accommodation for two modern methods of treatment, and preserves a delightful piece of Georgian architecture.

British Medical Journal.

SATURDAY, OCTOBER 29TH, 1927.

PREVENTION AND PERFECTION.

The problems dealt with by Dr. James Wheatley, county medical officer of health for Salop, in his presidential address before the Society of Medical Officers of Health a week ago, are of very great moment. The fundamental questions raised are the same as the more important of those discussed by Sir Robert Philip, the President of the British Medical Association, in his address at Edinburgh in July last. That address was entitled "The strategic front of medicine to-day," and in commenting upon it in a leading article (July 23rd, 1927, p. 138) we ventured to describe the objectives to be attained from that front as "prevention and perfection"; and, as we then said, "each of these objectives is being more and more recognized and insisted upon in our time." That the president of the Society of Medical Officers of Health should have made them, in effect, the keynotes of his address to his fellow members of the public health service at the inauguration of his year of office is further evidence of this recognition and emphasis.

Preventive medicine is by no means the concern of the public health service alone. It is the study and the work of the whole medical profession. Private practitioner and public health officer alike are passing beyond the mere recognition and relief of unhealthy conditions, whether in the individual or in the community, which was for so long their main business and still remains a great part of it, to the wider and more satisfying aim of preventing such conditions from arising. Beyond even this vista they are beginning to contemplate yet another, wider and more satisfying still. With increasing purpose, as Sir Robert Philip said, the doctor, whatever be the exact sphere of his professional work, has his "mind and eye fixed on perfection of form and function as the ultimate goal." We have ourselves more than once pointed out that health is not "the mere absence of disease," but "the complete development of body and mind—indeed, of the whole personality—to the full extent of whatever powers they possess."

There is a long way to go to these objectives. It is the more important, as Dr. Wheatley insists, that the right road should be taken, and that we should not be led by a false route or wander down too devious paths. He suggests, quite justly, that medical officers of health "should be able to take a broader view of health problems than persons engaged in one section of health work only," and yet that they "have not always accepted help from the best sources and have not always accurately judged the relative values of the different branches" of public health work. "It is quite possible," he says, "for certain measures to save individual lives, or protect individuals from grave calamities, and yet the complete result to the nation may be bad." He even raises the doubt, which is not a new one, and goes deep in this matter, whether the two objectives may not be incompatible—whether the successful prevention of disease may not, indirectly and in the long run, militate against the perfect health and development of those who escape it. Certain it is—and this may be regarded as Dr. Wheatley's main point—that if disease is not prevented in the right way and by the wisest means such a doubt becomes a probability.

Death is, in the end, unavoidable, and its mere postponement, which has hitherto been acclaimed as the main triumph of preventive and public health work, does not of itself produce a more healthy community. Indeed, other things being unchanged, the result must be the opposite of this. Neither to the individual nor to the community is the postponement of death a certain benefit. It is no more certain that even a successful warfare waged against a particular scourge must necessarily result in producing, by itself, a healthier race. Nor would the immunization of a whole people against a particular disease germ, or against all such germs, guarantee a greater perfection of national or human development if other conditions of heredity and environment remained unchanged. Yet doctors will continue to strive for the postponement of death, for the elimination of tuberculosis, of cancer, of venereal disease, and will protect the individual against the effects of disease-producing microbes by whatever means they can; and any triumphs they may have will be those of preventive medicine. The true means for achieving both the objectives, perfection as well as prevention, remain, and must be put in their proper place. It is the removal of the causes of ill health and poor development that has to be sought, and not the mere prevention of some of the effects of some of those causes. Wise behaviour is not only better than arsenobenzol, but better than packets. Measures which lead to care in mating, to radical improvement in environment, good housing and good feeding both in infancy and later, to real education in personal, domestic, and public hygiene, as well as in other matters, are the only certainly efficient weapons in this campaign, though others may win a battle or cause the fall of a redoubtable citadel.

Prevention of disease may some day be achieved: perfection of health never. In judging of results, therefore, we must beware of fallacies, especially of two which may be called the fallacy of the average and the fallacy of the physical. Curiously enough, there is a passage in Dr. Wheatley's address which illustrates both. "Past a certain age," he says, "but probably averaging about 60, life is no longer a national asset, but a national burden. This general truth is not vitiated by the fact that many men over 60 or 70 years of age have done work of extraordinary value." It is; otherwise the lethal chamber is indicated for all over 60. It is a complete fallacy to regard the exceptional merely as a contribution to the average, and not to give it its own, sometimes enormous, value over and above such contribution. It is a fallacy, too, even when calculating purely economic values, to consider only physical well-being. True, all-round perfection is what is aimed at. But in placing our imperfect results in the health balance we must weigh up what may go along with a feeble physique: a powerful and well poised mind, and surely, something more than both of these, in the personality which may be more enduring than either.

CLINICS FOR CHRONIC RHEUMATISM.

The successful treatment of the various forms of chronic rheumatism in insured persons is very difficult. The prevalence of these complaints—apparently an increasing prevalence—among the industrial classes, the grave impairment of industrial efficiency thereby caused, and the urgent need for taking some further action to meet this situation, have been fully recognized during the last few years. A number of conferences have considered the subject in most of its aspects, and various suggestions have been put forward

for dealing with the matter. In the year 1922 a committee of the Ministry of Health began a special inquiry; its report, issued in 1924, is a very valuable piece of work. In March last we published (SUPPLEMENT, March 12th, 1927, p. 85) the report of a conference called by the British Medical Association on spa treatment for insured persons. The main discovery of this conference seems to have been that, while all sections were anxious for something to be done and genuinely willing to co-operate, there were very great difficulties in the way of doing anything. The subject was under consideration again at the congress of the Royal Sanitary Institute at Hastings in July last. Sir William Willcox there delivered a lecture on the effect of chronic rheumatism in industry, and Mr. John Hatton, director of baths at Bath, outlined a scheme proposed by the British Spas Federation for the extension of facilities for treatment. Some account of these pronouncements was given in the JOURNAL of July 23rd last (pp. 143 and 145). Last summer, too, by invitation of the German Ministry of Health, a number of British medical men and representatives of industrial organizations attended the inauguration of a German committee on industrial rheumatism in Berlin, and visited various spas and special hospitals. A full account of this expedition and of some of the institutions and health resorts visited was published in the JOURNAL of September 17th last (p. 502). Last week Mr. Henry Lesser, who was among those who had thus visited Berlin, devoted his presidential address before the National Association of Insurance Committees at Harrogate to the subject of the need for clinics for the treatment of industrial rheumatism, and made the suggestion that national health insurance organizations—whether Insurance Committees or approved societies—should, with the sanction of the Minister of Health, co-operate in helping to finance the experimental clinic in London which has been proposed by the British Committee of the International Society of Medical Hydrology, and apparently sponsored by the British Red Cross Society, which, under the chairmanship of Sir Arthur Stanley, is launching an appeal for £40,000 as a foundation fund.

Commonly quoted statistics are that nearly one-sixth of industrial invalidity in this country is due to rheumatic affections, that such diseases cost the approved societies between £1,800,000 and £2,000,000 each year in sickness and disablement benefit, that the nation loses more than 3,000,000 weeks of work from this cause every year, that half of this loss is caused by chronic joint disease, and that the number of insured persons suffering in these ways approaches 400,000. These figures are sufficiently serious, and if Mr. Hatton's claim can be substantiated that 87 per cent. of patients are discharged cured or relieved from the hospitals at three of the principal British spas there is a clear case for a great effort to make such treatment available for insured persons. The scheme of the British Spas Federation is to take some 30,000 insured patients each year to the British spas, to place them in hospitals, in the less expensive boarding-houses, or in hostels under some supervision, and to give them an appropriate course of treatment at the bathing establishments. The approved societies appear to regard such a scheme as too expensive, and some of them propose that, since the patient cannot go to the spa, the spa treatment shall be brought to the patient, as at Berlin, Hamburg, and Dresden. Any such scheme in this country must be regarded as purely experimental. Though in Germany both the staffs of the hospitals and the officials of the organizations corresponding to our approved societies appear to consider that an appreciable measure of success has been achieved, statistics are almost wholly lacking; and there is room for a reasonable scepticism as to the permanence of relief in a large proportion of the cases referred to by Mr. Hatton. No doubt much good would be done by the establishment of a well equipped clinic in London under proper auspices and direction. Possibly approved societies might in due time recover in diminished sick pay whatever contributions they might be able to give. The main value of the clinic would, however, consist in the improved facilities and opportunities which it would afford for that clinical and pathological observation and research which is so necessary for further success in combating a baffling and obstinate national scourge.

THE PANEL CONFERENCE.

THE Annual Conference of Representatives of Local Medical and Panel Committees was held last week in the Great Hall of the British Medical Association. A full report of the proceedings is given in this week's SUPPLEMENT. The representatives were mainly engaged upon two matters, the one of major, the other of minor, importance. The former was the consideration of what has come to be called the "disciplinary machinery" of the national health insurance medical service; the latter was the question of devoting a small portion of the National Insurance Defence Trust Fund to encouraging the candidature of suitable medical representatives for the House of Commons. Last year's Conference gave to the Insurance Acts Committee a general authority to negotiate with the Ministry of Health on certain lines with regard to the revision of the Medical Benefit Regulations and procedure relating to alleged breaches of their terms of service by practitioners. Some quite important alterations in detail have now been agreed upon between the Committee and the Ministry; and an entirely new and purely professional committee is to be set up within the Ministry for the purpose of advising the Minister in every case involving questions of professional conduct, before he promulgates his decision. Half the members of this new committee will be chosen from a panel nominated by the Insurance Acts Committee itself, the committee will have full access to all relevant material, and it is to be presumed that no Minister would be unwise enough to act contrary to its advice. These proposals were endorsed by the Conference as preferable to a routine recourse to the Law Courts, and they are to be given a trial for an experimental period of three years at least. On the other matter the Conference, by a narrow majority, refused to endorse the proposal of the National Insurance Defence Trustees to ear-mark a sum of £1,000 for parliamentary purposes. This decision was possibly a wise one in the interests of the Defence Fund if, as may be presumed to be the case, the majority of subscribers, or potential subscribers, share the twofold misunderstanding which was apparent at the Conference. It appears to have been thought that such ear-marking would convert a non-political into a political fund, and so entail certain consequences. There can be little doubt, however, that the fund must be regarded even now as a political one, and so subject to any legal or other provisions which apply to such funds. Political purposes are none the less political because they are not associated with any particular party. Again, it seems to have been assumed that "the support of a member of Parliament" was aimed at, whereas the most frequent use of such a fund would be to give relatively small sums to a number of candidates by way of contribution towards their election expenses. It is found that a friendly and helpful act of this kind, in cases adjudged

suitable, is calculated to produce results in the direction of securing early information, sympathetic attention, and willing advocacy, which are well worth the encouragement. It is to be hoped that the decision of the Conference in this matter will merely result in increased attention and support being given to the Parliamentary Elections Fund of the British Medical Association.

THE INTERNATIONAL SOCIETY OF MEDICAL HYDROLOGY.

THE Annual Congress of the International Society of Medical Hydrology took place in Italy from October 12th to 16th, under the presidency of Senatore Professor Umberto Gabbi. Representatives of fourteen nations, numbering in all about 250, were present; the first three days of the congress were passed in Rome. On October 12th the inaugural meeting was held, by invitation of the Government, in the Campidoglio (Senate House) on the Capitol, the address of welcome being delivered by S.E. Pietro Fedele, Minister of Public Instruction, who was supported by the Governor of Rome, the Dean of the Faculty of Medicine, the Director-General of Public Health, and other distinguished Romans. The afternoon was devoted to scientific business at the University, papers on "The use of water in acute disease" being read by the President, Professor Strasser (Vienna), Drs. Fortescue Fox (chairman, London) and Sundell (London). In the evening the delegates were received at the Palazzo Chigi by Signor Mussolini, who expressed his pleasure at seeing members of so many nations united on Italian soil in the common fight against disease. On the next day the members were shown the principal sights of Rome, and were received at the Chamber of Deputies, where they were entertained to tea; afterwards they went to the tomb of the Unknown Warrior, where the President laid a wreath. The next place visited by the congress was Montecatini, a well known watering-place near Florence, which has been considerably developed of late years, largely owing to subsidies granted by the Italian Government for the purpose. Here they were welcomed by Senatore Professor Queirolo (Pisa), the honorary director of the baths, and shown the new bathing establishments, which, but for an unlucky accident, would have been officially opened on this occasion. During the next day further papers were read by Professors Valenti (Milan), Marfori (Naples), Razzano (Ischia), and Chassevant (Algiers), and Drs. Burt (Buxton), Judd Lewis (London), Joseph Race (Buxton), and Ferreyrolles (La Bourboule). In the evening a banquet was given at the principal hotel by the municipality, and this was followed by a dance at the "Sporting Club." Salsomaggiore, a spa lying between Parma and Milan, was next visited. The establishments here are on a most lavish scale, the Government having, since the war, advanced over three-quarters of a million pounds for their completion. Papers were here read by Professor Luigi Zoia (Milan) and Drs. Mougeot (Royat) and Woodmansey (Harrogate), the subject being the action of mineral waters on ferments and micro-organisms. On the next day the congress broke up, some members proceeding to Parma, where they were shown round the University and new hospital by the President, Professor Gabbi, who occupies there the chair of clinical medicine.

WHAT IS COMPARATIVE MEDICINE?

AT the meeting last week of the Section of Comparative Medicine of the Royal Society of Medicine Dr. Bradley put a most pertinent question and raised matters of great fundamental importance when he asked, "What is comparative medicine?" At the Edinburgh meeting of the British Medical Association the newly formed Section of Comparative Medicine debated a somewhat similar matter, and, as we publish reports of both discussions this week, it may be opportune to examine the result. Medicine itself must be regarded as a collection of more or less unrelated sciences, united by the single common factor of their bearing on health, whether of man or of his animals. In the past it has often been believed that veterinary medicine *per se* was comparative medicine, and while it is true that the collection of "medicines" studied by the veterinary surgeon must be to some extent comparative, it is equally true that comparative medicine cannot exclude man. There has also been a tendency in the past to limit comparative medicine to a consideration of veterinary diseases communicable to man, but it is now fully recognized that this view is far too narrow. Comparative medicine is most frequently conceived as the comparison between human and veterinary medicine, but some of the speakers in Edinburgh pointed out that it is even greater than this, and Dr. Bradley now confirms them. It is not a complete entity like human medicine, or like equine or bovine or canine medicine, or any of the other branches into which veterinary medicine is divided. It is really a method by which it should be possible to abstract from each of these their common fundamental truths. Comparative pathology is thus envisaged by one of the speakers at Edinburgh as the comparison of host reactions to a common stimulus; the comparative method will attempt to find, for example, an explanation of why the histology of the tubercle varies in different animals, and why it resembles, in the same animal, lesions caused by other chronic infections. Comparative immunology will, in a like manner, attempt to explain natural immunity; and so with the other branches. In this way will be formed a pure pathology, a pure immunology, and so on. These subjects grouped together will form pure medicine. In other words, this is the method by which pure medicine, as opposed to applied medicine, will be abstracted from facts discovered in its divisions; the method by which general theories will be built up and in turn prepared for reapplication in a new and wider sense. Looked at in this light comparative medicine is almost synonymous with pure medicine, and until the day when such a metaphysical concept can be called into real existence will of necessity have to replace it. Comparative medicine is, then, mainly a matter for to-morrow. Co-operation between human and veterinary medicine has been frequent in the past; it must be continuous in the future. The discoveries made by this co-operation must be first of all analysed and then synthesized into new and more comprehensive theories. It is only in this way that an all-embracing view of disease and the processes of disease is possible, and it is only when that becomes a reality that a war of extermination against the causes of disease can be successfully waged.

THE THAYER LECTURESHIP.

WILLIAM SIDNEY THAYER is well known in this country, and is not without honour in his own country. He was born on June 23rd, 1864, and after graduating at Harvard went to work under Osler at the Johns Hopkins Hospital, Baltimore, where he has remained ever since, except when, during the war, he was Brigadier-General of the Medical Corps and Chief Consultant of the Medical Service of the American Expeditionary Force. He was professor of clinical medicine 1905-18, physician-in-chief 1918-21, and now is Emeritus, but active as of yore, as shown by his recent elaborate monograph *Studies on Bacterial (Infective) Endocarditis*, noticed in our columns last year (1926, ii, 843). Like his former chief, the late Sir William Osler, he has captured not only the minds, but the hearts of his colleagues and pupils, and so it is no matter for surprise that on May 18th last, at Washington,

D.C., his friends presented to the Johns Hopkins Medical School the deed of gift (over 16,000 dollars) to be held in trust by the University as an endowment for "the William Sidney Thayer and Susan Read Thayer Lectureship in Clinical Medicine."[1] This income is to provide one or more lectures annually at the Johns Hopkins Medical School by men distinguished in clinical medicine, pediatrics, neurology, or borderline branches. The graceful introductory speech of the chairman, Dr. Frank Billings of Chicago, was followed by the presentation address prepared by Professor L. G. Rowntree, who originated the idea of thus honouring his former teacher. Provost Ames, who spoke not only as representing the Johns Hopkins University but as a grateful patient, accepted the lectureship on behalf of the president of the Board of Trustees. Other informal addresses were given by Drs. Simon Flexner, J. M. T. Finney, Thomas McCrae, T. B. Futcher, L. A. Conner, and Charles Minor, old friends and associates. Professor Thayer replied in a speech charming in its reminiscent vein. He confessed that at the beginning of his career and for many years afterwards his desire was to be a pathologist, but the necessity to earn a living obliged him to set up a door-plate in Boston, and during its three weeks' existence he had two patients; then by accident he heard from a friend of a post—that of "differentiating physician" to sort out the patients—and in thirty-six hours he was in Baltimore. Looking back on the experience of these years his opinion is that above all the art of medicine demands practice, and a good diagnostician is not born, but made by experience. There are, he goes on, "few short cuts in medicine. All the acquisitions of recent years have not shortened by a day the time that he who would be a skilled clinician must pass by the bedside." This lectureship is exceptional in being established during the lifetime of a physician, but it also perpetuates the memory of his noble wife, who, when fatally ill, urged him to go on the American Red Cross Mission to Moscow in 1917, knowing full well that she would not live to welcome him back.

YELLOW FEVER IN WEST AFRICA.

WHEN the work of Reed and his associates, and its practical application to Cuba and Panama, were followed by Noguchi's discovery of *Leptospira icteroides*, and the preparation of a serum and vaccine, it seemed that the world was in a fair way to be rid of yellow fever, but the disease still appears from time to time on the west coast of Africa, often in isolated cases, and attention has turned again to that locality, from which, according to Carter, the American yellow fever originated. In the course of an address delivered in Holland last March, Balfour recalled the demonstration by Theiler and Sellards that the relation between Weil's disease and yellow fever was far from clear, and said that the etiological significance of the *Leptospira* was by no means certain. It has been asserted in a recent United States public health report that the causative agent of yellow fever is still unknown. Schüffner and Mochtar have been unable to distinguish between *Leptospira icteroides* isolated from a yellow fever case at Vera Cruz and other *Leptospira* preserved by the Tropical Institute at Amsterdam, and some recent reports from West Africa emphasize these uncertainties. In eight cases (with five deaths) recorded by Aitken and Smith in Nigeria, the clinical picture differed definitely in several points from the authoritative description by Carter of classical yellow fever. In every case blood culture on Noguchi's medium was negative, injections of specific serum saved none of the four patients to whom it was given, and careful examination of the fatal cases revealed an unexpected variety in the nature and extent of the pathological conditions present. Ninaud, writing from French West Africa, records the recovery of a patient after four injections of 50 c.cm. of Noguchi's serum. The first three injections were followed at about a day's interval by a return of vomiting and other serious symptoms, suggesting, perhaps, that benefit was wrongly attributed to the serum, the phenomena representing really an instance of the occurrence of the repeated paroxysms and remissions which Le Fanu has noted among his cases on the Gold Coast. Ninaud adds that each injection was followed by a violent reaction with rigors, and he regards this as normal; but it did not occur in the cases treated by Aitken and Smith. In the annual medical report of the Gold Coast for 1925-26, Le Fanu gives an account of four successive cases treated effectively on new lines. Assuming the disease to be spirochaetal he gave novarsenobillon; he had seen many cases treated in other ways, and concludes that this arsenical preparation may be given with advantage in doses of 0.45 gram for men and 0.3 for women, at any stage unless anuria has set in. An important adjunct—the credit for the suggestion is given to Balfour—was the administration of glucose to maintain the nutrition and liver function, and thus to avoid the production of toxic ferments. The glucose is added to bland fluids given freely in small quantities, or where nausea was present by intravenous injection of a 5 per cent. solution. In Le Fanu's view these methods mark a definite advance in the therapeutics of yellow fever. The International Health Board, which played so large a part in ridding America of "yellow Jack," has appointed a commission to study the African problems on the spot, in co-operation with the officers of the British Colonial Service.

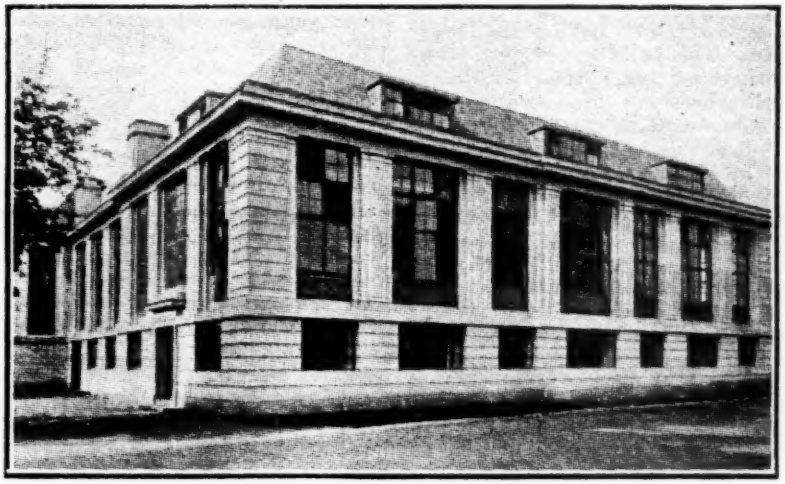
[1] *Bull. Johns Hopkins Hosp.*, Baltimore, 1927, xli, 1-10.

MEDICAL EDUCATION IN CHINA.

DR. J. L. MAXWELL, the secretary of the Chinese Medical Association, contributes to the July issue of the *China Medical Journal* an interesting account of the present position of the medical schools in China. He states that of these nine schools, four are still running more or less normally, two continue under a skeleton staff, and three are closed. One of these may, however, be reopened in the autumn after complete reorganization, but grave doubts are felt as to the possibility of beginning work again in the other two. Dr. Maxwell fears that the interference in medical education consequent on the military disturbances in China will have very serious results. There is at present a decrease of nearly 50 per cent. in the output of medical practitioners from the leading medical schools in that country; the previous supply was far below the needs even of the mission hospitals, and it will be very long before the former figures can again be reached. Moreover, many of the Government and other medical schools have been closed, and the financial condition of others is grave. The prospect of providing an adequate medical profession for the country has, therefore, receded very seriously. Dr. Maxwell adds that the mission hospitals—nearly 300 in number—are largely dependent on these schools for their staffs, and in the past have been grievously hampered by the difficulty of obtaining fully qualified Chinese medical practitioners. This evil will now be intensified, and already foreign countries are carrying a heavier burden in staffing hospitals than they can continue to bear. The death and invaliding rate among these doctors is believed to be heavier than in any other class of foreign workers. It is suggested that mission boards and committees should consider carefully the difficult situation that is now developing in mission hospitals, with a view to making more use of the valuable Institute of Hospital Technology, which has been in operation a short time; it is thought that its students might relieve hospital staffs of much burdensome incidental work.

THE SCHOOL OF BIOCHEMISTRY, OXFORD.

The School of Biochemistry in Oxford dates from 1887, when Dr. J. S. Haldane began to teach the subject within the department of physiology which had been established some five years earlier, when the then regius professor of medicine (Sir Henry Acland) had induced Burdon-Sanderson to leave University College, London. Recognition of the value and interest of the study of the chemistry of living things grew, and in 1920 University opinion was prepared gratefully to accept an offer from Mr. Whitley of Trinity College, which made possible the foundation of the chair of biochemistry; Benjamin Moore was its first occupant. After his premature death he was succeeded, in 1923, by the present occupant, Dr. R. A. Peters. The need for providing additional accommodation for physiology had long been patent, and it was decided to do this by erecting a new building for biochemistry. It is linked with the physiological laboratories by a new lecture theatre seating about two hundred, which is to be used in common by both, and has been so used since October, 1925; a year later the biochemistry classes were transferred to the new building, and the move was practically complete last January; although some of the rooms are not yet quite finished the department is now working as an organic whole, so that the University deemed it appropriate to celebrate this addition to its resources by a formal ceremony on October 21st, the last day of St. Luke's summer with which this year has tardily been graced.



School of Biochemistry, Oxford.

The Chancellor, Viscount Cave (Lord Chancellor of England), gave a short address in the Sheldonian Theatre to a distinguished audience, which thanked him through the Vice-Chancellor, and then followed to the new laboratories, which stand four square on a piece of ground, off South Park Road, which was once shrubbery. The walls are of brick faced with white cement, with, in order to secure plenty of light, lofty steel windows; the whole has something of the effect of those business premises of reinforced concrete with a wide expanse of window in metal frames, a style which, when it was introduced a few years ago, was much admired by many architectural amateurs.

The ground floor, in addition to the conjoint lecture room already mentioned, contains several research rooms, rooms for centrifuge and photography, various offices, and rooms for assistants. The first floor, mainly devoted to teaching, contains large classrooms placed side by side with steel and glass partitions which can be shifted if it be desired to alter the arrangement of space. From this floor a passage leads to the library, which has been constructed out of the old physiology lecture room. On a mezzanine floor several rooms have been formed, including one for gas analysis, and another lined with cork for constant temperature work. The second floor is wholly for research; in addition to ordinary research rooms, and one for the professor, there is an aquarium room supplied with water from a special part of the roof, which is tiled instead of being covered with asphalt. Another part of the roof is flat, and upon it has been placed a small open-air laboratory.

The architect, Mr. H. Redfern, F.R.I.B.A., is to be congratulated on designs which meet very well the special conditions with which he had to deal.

In spite of the benefactions of Mr. Whitley for the chair, and of the Rockefeller Foundation for the building, the University is itself undertaking a serious pecuniary responsibility. It has agreed to contribute a sum of £25,000 or its equivalent in annual income towards the general maintenance of the new department. The Rockefeller Foundation has also given £20,000 towards maintenance; for the building it gave £55,000, and the University £3,000 to meet the capital expenditure of the department of physiology.

Those responsible for the conduct of the department are, however, very desirous of obtaining further funds, chiefly for the purpose of providing studentships to enable selected men to stay in Oxford for one or two years to obtain training in research work. Other scientific departments feel the same need, and it is said that until it is properly met our country will not make the best possible use of the brains of the younger generation of the University of Oxford.

England and Wales.

Liverpool Medical Service.

The Liverpool annual medical service was held at the Cathedral on Sunday, October 16th. The Bishop of Chester (Dr. Luke Paget) preached an eloquent sermon dealing with the comradeship between medicine and theology in all medical work, and the necessity that their members should co-operate. He alluded to the fact that his father was a surgeon, and paid a warm tribute of admiration to the late Sir Victor Horsley. The Bishop of Liverpool conducted the service, and the lessons were read by two medical men. There was a large congregation, general and medical; some eighty medical women and men attended in robes. The collection, which amounted to £119 5s., was in aid of the Royal Medical Benevolent Fund.

New Physics Laboratory in the University of Bristol.

Sir Ernest Rutherford, O.M., president of the Royal Society and Cavendish professor of experimental physics in the University of Cambridge, opened, on October 21st, the Henry Herbert Wills Physics Laboratory, the latest addition to the buildings of the University of Bristol. This acquisition is the gift of the late Mr. Henry Herbert Wills, pro-chancellor of the University, who provided £200,000 for its erection and equipment. The laboratory, which is built in the Renaissance style, is L shaped, the long arm being arranged with a view to future extensions. The carvings in the spandrels over the main doorway represent the dispersion of sunlight by a prism, and the tracks of alpha particles from radium, thus illustrating early and modern discoveries in experimental physics. On the ground floor there are research rooms,

power rooms, and workshop; on the first floor more research rooms and laboratories for senior pupils; on the second floor laboratories for senior students of optics and laboratories for junior pupils; on the third floor is the library, several classrooms and private rooms for the staff. A large lecture theatre on the first floor will accommodate an audience of 300. A smaller theatre beneath it has a minimum seating capacity for 130; the acoustic properties of both of these theatres have received special consideration. At the junction of the two arms of the building is a tower 64 feet square which contains two large rooms available for research work; its roof is flat in order to facilitate certain forms of outdoor experimental work. In equipping the new laboratory provision has been made for the researches of the existing staff and for the present requirements as regards teaching; a small reserve fund has been formed for future needs. A professorial chair in theoretical physics has been established and two new Fellowships.

A Convalescent Home for Birmingham Patients.

The Minister of Health opened new buildings at a convalescent home in Tyn-y-coed, overlooking the valley of Llanrwst, on October 1st. This home has enabled many thousand Birmingham workers to recuperate after illness, and the number of applications has increased so considerably that it has been found necessary to expand the accommodation from sixty-five beds to 125. In the course of the proceedings it was stated that through the Hospital Saturday Fund, the promoter of this work, no fewer than 117,540 patients had already been treated. The cost of this extension was estimated at about £34,000, half of which has now been subscribed. Mr. Neville Chamberlain commented on the gratifying fact that the new building resulted from the voluntary efforts of the working population of Birmingham. The achievement was the more meritorious because of the recent severe unemployment and underemployment in that city. He added that the work of the convalescent home was not merely curative, it was also preventive, and would result in the saving of money as well as of health.

Hartlepool Infirmary: New Operating Theatre.

In consequence of the steady increase in surgical work at the Hartlepool Union Infirmary a new operating theatre has been equipped at a cost of £2,350. The walls of the new theatre are coloured green in order to avoid glare, and all the fittings are fully modern. The chairman of the board of guardians, presiding over the formal opening on October 10th, explained that for many years such an improvement in the surgical department had been urgently necessary, but financial considerations had prevented anything being done. Insufficient accommodation at the voluntary hospitals had, however, rendered some action necessary, since in the event of a serious accident affecting several people that institution was obliged to provide beds. He added that the cost of upkeep was lower than that of any other similar establishment in the North of England—namely, 7s. 4d. a head, as compared with 9s. 8½d., which was the average for Northumberland, Durham, and the North Riding of Yorkshire. Dr. T. G. Ainsley, senior medical officer, stated that for many years operations had been conducted in a theatre improvised out of a ward kitchen. Inadequate ventilation had rendered the use of the room impossible for this purpose, and for the last four years the surgeons had been consequently compelled to operate in the wards. During recent years verandahs had been added to accommodate over fifty beds, a nurses' home had been built, and electric light had been installed. It was proposed to provide before long helio-therapeutical apparatus; moreover, the nurses' home required further enlargement.

Malarial Therapy in London Mental Hospitals.

The London County Council has approved, as an experiment for one year, a scheme for the co-ordination of the work done at the mental hospitals in the county of London in connexion with the treatment of general paralysis of the insane by induced malaria. The scheme provides that all cases of general paralysis of the insane treated by malaria shall be reported to the central pathological laboratory. A special medical officer is to be seconded to the central laboratory whose duty it will be to maintain the records and, under the direction of the director of the laboratory, to give his time to research work on the malarial treatment of general paralysis. It would be his duty also to visit the various mental hospitals and to report abnormalities in cases under treatment. A return of all patients discharged after malarial treatment is to be made to the central laboratory, and the special officer will follow up the after-history of such cases, visiting them when desirable, and making such arrangements as are practicable for them to undergo tests at stated intervals. The expenditure is expected not to exceed £480 for the experimental period of one year.

Enlargement of Evesham Hospital.

Towards the end of last year the committee of Evesham Hospital decided that this institution must be enlarged, at an estimated cost of about £18,000, and that the most urgent part of the work should be done first. An appeal was made for £9,000 for this first part, and £8,378 has been subscribed or promised, but the work now completed has actually cost £11,764. There is thus at present an outstanding debt of £3,386, and it is estimated that the second part of the enlargement scheme will involve an additional £4,500. On September 28th the portion of the extension already completed was opened. The new accommodation includes a public ward for women, with twelve beds; an improved operating theatre, anaesthetic room, and dressing room; a ward for children, containing four beds; a temporary *x*-ray room; eight nurses' bedrooms; and an additional bathroom; enlargement of the kitchen; and various accessories. Evesham Hospital has been established for fifty-one years, and it is confidently expected that the further funds necessary will be obtained.

Ireland.

Medical Registration Council.

The Medical Registration Council for the Irish Free State has been completed, and its constitution is as follows:

Executive Council (Irish Free State Government): Dr. H. F. Moore and Dr. J. N. Meenan.
University College, Cork: Professor J. Dundon.
Royal College of Surgeons: Sir Arthur Chance.
Royal College of Physicians: Professor T. G. Moorhead.
Apothecaries' Hall: Dr. E. Magennis.
Trinity College, Dublin: Professor A. F. Dixon.
University College, Dublin: Dr. D. J. Coffey.
General Medical Practitioners of the Free State: Dr. R. J. Rowlette and Dr. Maurice Hayes.
University College, Galway: Professor Stephen Shea.

The members of the Council, according to the Medical Practitioners Act, will hold office for five years, and any vacancy arising from death, resignation, or disqualification will be filled by the body which the deceased or resigned member represented, the new member to hold office for the residue of the term of the deceased or resigned member. The duties of the Council will be the administration of the Act, including the preparation, establishment, and maintenance of a register of practitioners in the Free State. When the Council has fixed a date for the establishment of the register—not later than ten months after the passing of the Act—the Minister for Local Government and Public Health, by notice in *Iris Oifigiuil*, will declare the establishment of the register as from that date.

Dublin Memorial to Professor Adrian Stokes.

A meeting for the purpose of establishing a memorial to the late Professor Adrian Stokes, of whom an obituary notice appeared in our issue of October 1st (p. 615), was held in the School of Pathology, Trinity College, Dublin, on October 17th. The new Provost, Mr. Edward J. Gwynn, presided, and those present included many leading members of the medical profession in Dublin. The Provost briefly reminded his hearers of the special connexion of Adrian Stokes with the University of Dublin, and the many reasons why his name ought to be perpetuated there, and in so doing paid a fine tribute to Dr. Stokes as a sportsman. Sir John W. Moore, in proposing the establishment of an

Adrian Stokes memorial, spoke of the ancestral connexion of Adrian Stokes with Trinity College and its famous school of medicine, of his brilliant professional career, and of his splendid scientific work while on active service in France. Professor T. Gillman Moorhead, in seconding the resolution, said that the phrase "well beloved" undoubtedly applied to Adrian Stokes, whom above all he liked to remember as a friend. "We honour ourselves," said Professor Moorhead, "in honouring him, and we want to perpetuate his memory in this school." The resolution, the terms of which are indicated in a letter from Professor J. W. Bigger and Mr. Seton Pringle, published this week in our correspondence columns, was passed unanimously, and an executive committee was appointed.

DENTISTS BILL, 1927 (IRISH FREE STATE).

The Minister for Industry and Commerce (Mr. McGilligan), in dealing with the second stage of the Dentists Bill, stated that its object was to regulate the internal arrangements with regard to the control of dentists in the Irish Free State, and was pretty well identical with the international agreement regarding the control of medical education. The bill, he said, was, with the exception of a few minor changes, similar to the bill that was before a former Dail. To gather the full effect of the proposals attention should be paid to the Medical Practitioners Act passed last June. The bill provided that the control of dental practitioners should be in the hands of Irishmen in the Free State. Sir James Craig (Dublin University) said that he had supported a second reading on two former occasions, but in this bill he found Clause 43 objectionable. It said that "it shall not be lawful for any person on or after the date of the passing of this Act, to practise, or hold himself out, whether directly or by implication, as practising, or being prepared to practise, dentistry or dental surgery, unless such person is a registered dentist." A sub-section allowed the performance by a registered medical practitioner of any surgical operation in connexion with the tissues of the mouth or jaws, or the giving by a registered medical practitioner of any dental treatment, advice, or attendance in urgent dental cases. It was ridiculous, he said, to put the word "urgent" into the bill. He did not approve, either, of the principle that medical men should not be allowed to practise dentistry. For instance, if a poor labourer came to the dispensary doctor suffering severe toothache, the doctor, if he extracted the tooth, would be acting illegally under this bill. Was the man to be sent, perhaps, twenty miles away to a dentist, and then have to pay a fee for that which he could have had for nothing at the dispensary? Dr. O'Dowd (Roscommon) and Dr. Hennessy (Dublin City South) also opposed the sub-sections limiting the practice of future medical practitioners.

Scotland.

IMPROVEMENT OF THE PUBLIC HEALTH IN SCOTLAND.

IN an address delivered by Dr. William Robertson, M.O.H. Edinburgh, in the Central Hall, Edinburgh, on October 16th, he said that the city had passed through various reformations of which one of the most important had been that in public health. Koch, by his discovery in 1882 of the existence of the tubercle bacillus, and by succeeding in growing it outside the human body, had awakened the scientific world to the importance of reviewing the whole problem of possible prevention and cure. In 1900 there had been 548 deaths from pulmonary tuberculosis and 270 from non-pulmonary tuberculosis in the city of Edinburgh. A quarter of a century later, in 1926, the deaths from these two sources were respectively 356 and 126. The saving of life could not, however, be rated in actual figures; it was evident that more people were being kept alive to earn wages and to be serviceable citizens. The successors of the present generation would reap the benefits of the present-day agitation in favour of tubercle-free milk supplies, for local authorities were now armed with strong powers for dealing with cows that spread infection. Moreover, slum clearance and improvement schemes were, in Edinburgh, about to transfer more than twenty-five thousand persons to better surroundings. The infantile mortality figures had already been reduced from 143 deaths per 1,000 births in 1880 to 80 per 1,000 recorded in 1926. This meant an annual saving of 63 lives among every 1,000 births. Thus money had been saved, lives had been protected, and the expectation of life had been increased in Edinburgh by 17 years.

A MATERNITY AND CHILD WELFARE HOSPITAL.

The value of a maternity hospital in a large industrial area is emphasized by Dr. G. V. T. McMichael, medical officer of health for the burgh of Paisley, in his annual report for 1926. When the Barshaw Maternity and Child Welfare Hospital was opened in 1921 eighteen beds were provided for ante-natal cases, for abnormal and complicated labour, and for those necessitous patients whose circumstances rendered safe confinement at home impossible. During 1926 arrangements were made to utilize one of the children's wards for maternity cases, the accommodation for which is now thirty beds, but the demand is increasing; Dr. McMichael believes that it will be necessary before long to devote the whole hospital to maternity work. The number of admissions to the ante-natal ward reached last year the record total of 182, as compared with eighty-three during 1922, the first year of the hospital. The success of the ante-natal clinic is attributed largely to the fact that hospital treatment for diseases of pregnancy is always available at Barshaw. The number of confinements in the year under review was 388, as compared with 201 in 1922. Patients treated in the maternity wards are required to contribute according to their household income. When the hospital was opened two wards were allocated to children, one for medical cases and one for minor surgical cases, but owing to the increased demand for accommodation for maternity patients only one ward is now available, and arrangements have been made for the medical cases to be admitted to the fever hospital.

ROYAL PHYSICAL SOCIETY OF EDINBURGH.

At a meeting of the Royal Physical Society of Edinburgh, on October 17th, Dr. John Stephenson read a paper on "Eastern adepts and Western science" in which he discussed the reputed power of the yogis to modify the beating of the heart at will. A yogi of Bombay is reported to have been able to stop his pulse in either arm for two or three minutes, and that of the temporal artery for several seconds. Mechanical records had shown that the heart beat was slowed and made less forcible, but not completely stopped. This yogi had apparently acquired a certain amount of voluntary control over the sympathetic nervous system, but more observations were required before either the facts or the explanation could be accepted. At the same meeting a study on "The pigmentation of the rabbit" was communicated by Dr. F. A. E. Crew, who said that adult Himalayan rabbits, which normally are white with black tips on the nose, ears, legs, and tail, can be made to grow black by lowering the temperature of the environment, and white tips can be produced in place of black by raising the temperature. Local application of low temperature at any part was also found to stimulate the growth of pigmented hair. The pigmented granules had been found to originate in the epithelial cells of the hair follicles and later to pass to the growing hair. The production of pigment by low temperature was explained by the stimulation of secretion of oxidase and the consequent production of pigment by its combination with a colourless chromogen.

GRASS DISEASE AMONG HORSES.

The serious mortality among horses in Scotland caused by "grass disease" is of great importance to farmers, and it is also of considerable interest to medical men on account of an alleged connexion with encephalitis lethargica. The subject of grass disease was discussed at a meeting of the Scottish Branch of the National Veterinary Medical Association at Gleneagles Hotel on October 15th. Professor

W. A. Pool, Director of the Animal Diseases Research Institute, Liberton, gave an account of the history of grass disease which suggested that it was first encountered in 1907 at Barry Camp, Forfarshire. It was supposed to have spread gradually until now cases had occurred in every county in the north-east of Scotland. The disease had been attributed to various organisms, including types of streptococci in the nervous system of animals suffering from the disease, but the latest evidence suggested that these were of only secondary importance. Considerable attention had been given to the possibility of fungi causing diseases of this type. It had also been suggested that the disease was the same as botulism, but the symptoms of the two diseases were different, although four types of the *Bacillus botulinus* were recognized. The lecturer thought that the cause of grass disease was at present an open question. Professor Russell Grieg of the Royal (Dick) Veterinary College, Edinburgh, described the clinical symptoms of acute grass disease, which gave some indication as to the nature of the toxin producing them; it belonged apparently to the so-called sympathico-mimetic group. The discussion was continued by Professor Clark of Edinburgh University, who declared there was a fairly strong probability that the disease was caused by a toxin of some kind. Dr. Dryerre, lecturer on biophysics in Edinburgh University, suggested the possibility of dietetic irritation of the mucous membrane as a cause. Mr. John Brown, F.R.C.V.S., who was inclined to attribute the disease to inhalation, and who said that cases occurred on uncultivated land as well as in highly cultivated areas, was among numerous other speakers.

Correspondence.

DUBLIN MEMORIAL TO ADRIAN STOKES.

SIR,—At a meeting held in Trinity College, Dublin, on October 17th, with the Provost in the chair, it was decided to inaugurate a memorial to the late Professor Adrian Stokes, who died of yellow fever contracted during research work on that disease in Lagos.

It was the opinion of the meeting that Stokes's connexion with Dublin and with Trinity College—as student, as assistant to the professor of pathology, and as professor of bacteriology—could best be commemorated by the foundation of a scholarship, prize, or medal in connexion with the study of pathology and bacteriology in Dublin University. An executive committee was appointed and was empowered to collect funds and to consider a suitable form of memorial, the exact form of which will depend on the amount collected.

Those who would like to take part in the establishment of such a memorial to one of Trinity's ablest and most loved sons are invited to send their subscriptions to the honorary treasurers of the fund, Mr. Robert Russell, S.F.T.C.D., and Professor A. F. Dixon, Sc.D.—We are, etc.,

SETON PRINGLE, F.R.C.S.I.,
JOSEPH W. BIGGER, M.D.,
Honorary Secretaries, Adrian Stokes Memorial Fund.

School of Pathology, Trinity College, Dublin, Oct. 19th.

MINERS' NYSTAGMUS.

SIR,—Your issue of October 1st (p. 612) contains a very interesting letter from my friend Mr. A. S. Percival. Everyone who knows Mr. Percival entertains for him the most cordial respect, and anything that he may say deserves careful consideration. At the same time, as regards the origin of miners' nystagmus, I have difficulty in accepting his view of it. The fact remains that a good number of pits are quite free from miners' nystagmus. There are a considerable number of such pits in the area in which I work, and it is interesting to observe that no fewer than six of these are oil safety lamp pits, no other light being used. That is one group—pits from which I get no cases whatsoever. In a second group cases do occur, but sporadically; now and again I see patients from them, but not regularly. In a third group the disease seems to be rampant, and it is to be remarked that a fair number of the pits in this last group are lit entirely by electricity. Now if I am not doing my learned friend an injustice his theory would imply that in some pits there are no men with an hereditary predisposition, in other pits there are a few, and in the third group there are a great number. Dr. Haldane's theory would involve that in the first group of pits the lights are invariably excellent and satisfactory—it is to be noted that six of these pits are oil safety lamp pits—that in the second group the lights are sometimes good and sometimes bad, and in the third group they are invariably bad. Dr. Haldane may be able to assent to such a proposition; personally I am quite unable to do so.

It is to be remarked that in the reports which were published, and which I have somewhat stringently criticized in the *Proceedings* of the Institution of Mining Engineers, there is no record made of any investigation as to case incidence. Had such investigation been made by men competent to handle vital statistics it would have been found that in many instances the disease seems to be an epidemic. That, at any rate, is how it appears to me. Just now the disease is very prevalent in one group of pits in the south-west of Scotland. In another group of pits near the centre of Scotland the disease was very rampant in one particular pit some months ago. Scarcely a week passed but what some cases occurred. For the last few months I personally have not seen a single case from that pit although there has been no change in the illumination, but the disease is now rampant in another pit not very far from the first. Then, again, we have records of cases appearing in men who have never been down a pit at all. Personally I have never seen any such cases, but the reports which have been issued of persons so afflicted leave little doubt in my mind that men who have never been down a pit at all may take miners' nystagmus. The whole subject requires reinvestigation, and that on a far broader basis than the last. I have little confidence in a committee which did not investigate the case incidence, and which did not, with the exception of one member, pay any attention to the disorders of the circulation. I incline towards the opinion that the facts which I have observed are best explained by supposing the presence of a toxin or of micro-organic life. To my way of thinking they are not explicable on the theory of defective illumination.—I am, etc.,

FREELAND FERGUS.

Glasgow, Oct. 15th.

ACTINOTHERAPY IN JOINT TUBERCULOSIS IN CHILDHOOD.

SIR,—As I have used actinotherapy since 1914 in the treatment of osseous and arthritic tuberculosis I venture to give my views on its value. Like Dr. Hartley Martin I think the opinions expressed by Drs. Crosbie and Aidin are too sweeping and pessimistic; at the same time they contain a large element of truth.

It is hardly necessary to emphasize the difficulty of assessing the value of any one form of treatment, but it may be well to point out that whenever a new therapeutic method is introduced one is immediately assailed with statistics apparently proving the almost universal efficacy of the remedy; it is only after long years of patient sifting of evidence that its degree and sphere of usefulness are established. For the last thirteen years I have treated children with bone tuberculosis by ultra-violet radiations obtained from various sources—for example, the Hanau and Jesionek mercury vapour lamps, the long and short flame carbon and tungsten arcs. An erythema dose was aimed at in the majority of cases. The children were treated by ordinary "conservative methods" at the same time, and all but a very small number have been kept under continuous observation to this date. Recently the records of the last 120 such cases treated with ultra-violet light up to twelve months ago have been carefully reviewed, and bear out the conclusions reached from one's previous experience, both among in-patients and out-patients. Of these 120 cases six definitely became worse, and as these improved soon after the radiations were discontinued it is possible

that the remedy produced the ill effects; thirty-eight showed marked improvement which could only be attributed to ultra-violet light therapy, after all other possible factors had been considered. The disease was arrested in the majority of the remaining patients, but the result would probably have been as successful with ordinary conservative treatment without actinotherapy.

A study of these and my previous cases has led me to form the following opinions:

(A) *In the Cases Improved by Radiations.*

1. Some chronic cases with multiple sinuses which were not getting better or were actually becoming cachectic improved, especially with mercury vapour lamps. It was impossible to decide beforehand which patients would, and which would not, respond to ultra-violet light treatment.

2. Cases of some months' duration with single sinuses and localized disease reacted in a similar way to the chronic cases.

3. In about a fourth of the patients the beneficial effect of "light" was shown by an increase in the calcification of the bones. The carbon and mercury vapour lamps were equally efficacious in producing this result.

(B) *In the Cases not Showing Improvement.*

1. The progress of the disease in early acute cases was not arrested by light, nor was bone destruction prevented in such cases.

2. The reason for the failure of this treatment in the other cases which did not improve could not be determined. It was not due to the type of lamp used, nor to the exposure, nor to the period of treatment, as these factors were all varied in different instances without result.

3. Ease of pigmentation did not mean that a patient would do well.—I am, etc.,

C. LEE PATTISON, M.B., M.R.C.S.,
Medical Superintendent, King Edward VII Hospital, Sheffield.

October 16th.

"THE HISTORICAL ASPECTS OF QUACKERY."

SIR,—I suggest that Professor Clark's argument, by which he attempts to vindicate his statement about the followers of Abrams, is insupportable, because on his own confession it is based entirely on the assumption that those who use "electronic" methods commit themselves to Abrams's electronic theory—a theory, which, it is conceded, postulates that the apparatus employed is "of universal application in disease" (destruction of tissue excepted). This assumption is incorrect. On page 19 of *Abrams' Methods of Diagnosis and Treatment*, edited by Sir James Barr, the following statement occurs: "We do not at this stage of our knowledge advance it as our own." The word "we" refers to the majority of doctors who use Abrams's methods in England, the book being fairly representative of their opinions. The word "it" refers to Abrams's electronic theory. There can therefore be no doubt of the incorrectness of Professor Clark's primary assumption. On page 33 it is stated "reactions cannot be relied upon . . . to furnish us with diagnoses in clinical terms," and at the top of page 24 the unreliability of Abrams's diagnosis, when it is divorced from ordinary diagnostic methods—even, indeed, when it is used purely as a guide to the use of Abrams's treatment methods—is discussed. This disposes of Professor Clark's questions about diagnosing cancer, etc., at all events in relation to the majority of those who use "electronic" instruments. Sir James Barr will, no doubt, deal with the question as it specifically concerns his private views. Furthermore, reference to page 18 will show that the Abrams system is regarded only as an adjunct to orthodox medicine (which, therefore, is not forsaken); while reference to pages 14 and 47 is sufficient to indicate that it is not sought as a universal cure.

Widely divergent individual theories, like that of Sir James Barr and my own, obviously cannot constitute the basis of agreement between British doctors who use Abrams's methods. Professor Clark wants to know what the "orthodox electronic faith" is, and he shall be answered. It is solely the belief that certain phenomena, demanding investigation, exist. There may even be no essential relation between these phenomena and Abrams's machines.

As regards my own independent theory, I once thought that the phenomena must be mechanically explained and that Abrams's idea was probably right. Now I have arrived at the conclusion that they are psychically determined and can be similarly connected with most, if not all, medical methods, orthodox or unorthodox. I hold that their recognition will be helpful to scientific medicine and will deal quackery a more effective blow than it has yet received, my reason for thinking so being that they throw light upon the results constantly attending the use of quack and other methods, the successful operation of which from the physical standpoint appears unintelligible or improbable. I am prepared not only to demonstrate them, but to set forth the steps of inductive reasoning by which I arrive at my particular explanation of them.

It matters little what opprobrious term Professor Clark chooses to apply to qualified "dissenters from inductive science," and I consider that his reply to me was an evasion of the essential point. This is, that he ought not to apply any opprobrious term to any of his qualified brethren, (*a*) because he does not make thorough investigation before passing judgement on them; (*b*) because, even if he did, he is no more qualified than they are to determine what is or what is not sound reasoning in medical matters.

The book to which I have referred is at present the only authoritative British work on the subject of Abrams, and in it not a single sentence is to be found which justifies Professor Clark's position.

I submit, Sir, that conclusive proof has now been afforded of the inaccuracy of Professor Clark's derogatory statement about the followers of Abrams in this country, and I am therefore going to ask him definitely to withdraw it, together with his suggestion that these doctors are quacks or in any way akin to quacks.—I am, etc.,

J. KENELM REID.

London, W.1, Oct. 24th.

SIR,—Professor Clark tells us that he said very little against Abrams, but he should know that it is not what he said, but the nasty way he said it, that matters. He thought that a few lines of ridicule from a professor of pharmacology would be sufficient to demolish Abrams's followers. That game was tried in America, but where the American Medical Association failed Professor Clark is not likely to succeed. I am going to show him that it is a dangerous game to call better men than himself quacks. No amount of evasion will now shield him. Viscount Gladstone did a good service to society when he showed that even the dead cannot be libelled with impunity.

He, Professor Clark, showed his incapacity by making charges of quackery unsupported by evidence; it was therefore unnecessary for me to adduce proof of a self-evident fact. He is now apparently content to remain in "everlasting ignorance," rather than take the advice of Herbert Spencer.

He draws some inferences, which he thinks will suit his case, from my address and demonstration at the South-West of London Post-Graduate Medical Association, in October, 1924. It would be more to the point if he gave some quotations such as the following:

"I do not ask you to-night to accept anything which I tell you until you have proved its accuracy. The only knowledge worth a tinker's curse is that which a man acquires for himself and makes his own."

"There is nothing in Abrams's methods beyond the competency of the general practitioner, but I wish to warn you that Abrams's methods are not substitutive of, but supplementary to, ordinary medical knowledge, and the better you know your physiology, the more successful you will be in the acquisition of this new knowledge."

"I do not wish you to infer that I consider Abrams's methods as the *summum bonum*. They are merely steps in the path of progress. The more scientific medicine becomes, the simpler it will become."

There is not one word in my address which I would now alter, modify, or withdraw.

Although Professor Clark cannot make a diagnosis from a specimen of blood or handwriting, that is no reason why others should be equally incompetent. The procedure, like all science, is quite simple, but certain precautions have to be taken; an important one is that there should be no

contamination by untutored fingers. As Mr. Legge would say, you should cultivate the thinking hand. I succeeded the first time I tried. I would advise Professor Clark not to get despondent over his incapacity; take the advice of Herbert Spencer, and follow the example of Bruce and the spider—try, try, try again. I have myself heard men denounce Pasteur and Lister who were afterwards sorry for their temerity.

I was under the impression that I have often said that there should be no one method in medicine. The oscilloclast is not always available, nor is it always necessary. You can then fall back on the expectant method, which has been long and widely practised in orthodox medicine. This is less cumbersome than the oscilloclast, and has the great advantage over pharmacology that there is no risk of poisoning your patient, who is just allowed to live, or die a natural death—fortunately the vast majority live, hence expectant treatment is a profitable business.

Professor Clark says: "Sir James Barr is the most distinguished electronist in this country." This may or may not be intended as a compliment, probably not, but as one who has always inveighed against mere authority, and held that no enlightened individual should accept any doctrine which did not accord with his own reason, I can treat the compliment with the contempt which it merits. There are in this country many who have had much more experience with Abrams's methods, and there are hundreds here and abroad who have accomplished feats which I never attempted.

He is very cynical about Abrams's methods of treating tuberculosis, which seem to be beneath his contempt. Well, they are the best that I know of. Some time ago I said that Spahlinger's treatment may be better, but I did not know Spahlinger's, and until its superiority was established I would continue to recommend Abrams's.

Six weeks ago I saw, with an Abrams practitioner, a gentleman suffering from pulmonary tuberculosis, who had been recommended by his orthodox medical advisers to go to Davos. I agreed with my friend that he should have a course of Abrams's treatment, including the gamboge paint and the yellow silk blouse. I saw him again a few days ago and he was cured. He had gained flesh and colour, his cough and expectoration had disappeared, his temperature was normal, his vital capacity had greatly improved, he could count over forty in one breath, whereas his previous limit was under twenty. He said that he felt perfectly well and could walk any distance, but he had no intention of swimming the Channel. He returned home this week-end.

When Professor Clark can do better than that I shall adopt his methods, but I am afraid that I shall be a very long time dead before that happens.

In Abrams's methods the senses of hearing and touch are diligently cultivated, while the most easily deceived of all our senses, sight, takes a subsidiary place, though it is never neglected. I am afraid that life is too short to teach Professor Clark the effects of colour vibrations, though they only occupy an octave of light.—I am, etc.,

London, Oct. 22nd. JAMES BARR.

SIR,—There is no need for Professor Clark to point out to homoeopaths the manifest absurdity of believing that the thirtieth dilution of a drug contains a single molecule, atom, or electron of the drug. The homoeopath knows perfectly well that his high dilutions do not contain any matter at all—that is, in any of the forms under which matter is recognized by modern physics. But surely Professor Clark is not so wedded to matter that he has forgotten the existence of that which is equally demonstrable, though immaterial—that is, energy.

Professor Clark considers it absurd to believe that these dilutions have any effect whatever. It is, of course, absurd and inconceivable, but then inductive science is not concerned with inconceivabilities; it is based on experiment under proper controls. The argument from inconceivability is not an argument which any real scientist will allow to be valid. If Professor Clark will refer to the Horder Report on the Emanometer of Boyd to the Royal Society of Medicine he will find that, however inconceivable it may seem, drugs in high dilutions *do* produce effects which can be demonstrated.

Professor Clark suggests that homoeopathists are opposed to orthodox medicine. This is a misconception. Homoeopaths are not opposed to orthodox medicine, but are opposed to orthodox *medicine-giving*, which is a very different thing.

As to homoeopaths being "opposed to the chief basic theories of chemistry and physics," I have heard Sir Oliver Lodge, whose knowledge of physics and whose good faith will not be questioned, state publicly that in his opinion homoeopaths, by reason of their concepts, were the most likely to understand and apply the findings of modern physics.

In conclusion—homoeopathy is not a "faith," or a "cult." It rests on the tripod of observation, experiment, and induction, and can thus justly claim to be scientific.—I am, etc.,

Liverpool, Oct. 22nd. F. B. JULIAN.

A PROPOSED ASTHMA RESEARCH COUNCIL.

SIR,—In the article on page 746 of the JOURNAL for October 22nd you quote the assertion in the notice of the formation of this council that, though palliatives have been found, "no certain cure exists," and, further, that "the cause of asthma is unknown." There is, of course, a great deal of truth in this assertion, but it does not contain the whole of the truth, and suggests an attitude of hopelessness which is very discouraging to the unfortunate asthmatic. There is, truly, no certain cure for every case, but it is certain that many cases are cured. Those who care to study the illuminating experimental researches of Dixon, Brodie, and Ransom will obtain from them much information as to the cause of asthma. They will learn that an exciting cause for the attack may be localized in the nose, and should there be sought for and removed. Even though the predisposing cause may not necessarily be done away with, a vicious circle may be broken and a practical cure brought about. There are many cases in which the removal of nasal disease has resulted in the complete disappearance of the asthmatic attacks. It is extraordinary, however, how long patients with asthma are allowed to go on without rhinological treatment, even in the presence of very obvious nasal disease, and this "distressing and incapacitating" disorder unnecessarily prolonged.—I am, etc.,

London, Oct. 24th. JAMES DUNDAS-GRANT.

DRIED COMPLEMENT IN THE TROPICS.

SIR,—In two recent letters in the JOURNAL Dr. Neave Kingsbury (September 17th, p. 518) and Major Anderson, I.M.S. (October 8th, p. 663), relate their experience of the use of dried complement in the Federated Malay Straits and India respectively. Both agree either that (*a*) the sample used was not a representative one, or (*b*) that dried complement is not suitable for the tropics. The age of the dried complement at the time of trial is not stated in either letter, and judging from a short experience of dried complement in England (some ten or twelve tests) I am convinced that this is the vital point. The complement I used was also a German preparation, and the advantages claimed by the makers I found to be true, with one exception—namely, that the titre would keep practically indefinitely. Using a supply from three to (?) six months old, which was stored in an ice-box, I had very satisfactory results. Titres varying from 1 in 40 to 1 in 65 or more were obtained. The Wassermann method used was No. 1 Medical Research Council, elaborated by Colonel Harrison.

On the other hand, dried complement from the same makers twelve months old was found to be inert. I found no difficulty in getting a clear solution, and the method adopted was to shake out the granular material evenly on to the surface of normal saline (not distilled water as directed) in a watch-glass. After a little time any small portion not dissolved was broken up with a glass rod.

I am fairly confident that dried complement, such as I

used, would be valuable in the tropics, provided small fresh supplies could be obtained direct from the makers.—I am, etc.,

Bath, Oct. 8th. J. COWAN, M.B., Lieut.-Colonel (Ret.).

SIR,—In connexion with the reference to dried complement in the tropics (Dr. Neave Kingsbury, September 17th, p. 518, and Major Anderson, October 8th, p. 663), we were asked some years ago if dried complement could be made and sent to the tropics in a satisfactory condition. After a considerable amount of investigation the staff of the Wellcome Physiological Research Laboratories succeeded in making a reasonably stable dry powder. Experimental batches were sent to the tropics, and after they had proved to be satisfactory we supplied the product for some time, but the demand was not encouraging and its issue was discontinued.

Our experience indicates that the dried material can probably be prepared suitable for use in the tropics, but we are informed by the staff of the laboratories that its preparation entails vigilant control and continual supervision, and the loss in the process is considerable.—We are, etc.,

London, E.C.1, Oct. 18th. BURROUGHS WELLCOME AND CO.

REFRACTION "HOSPITAL."

SIR,—In your issue of October 22nd (p. 753) there is a note that the opticians of Glasgow propose to establish in their city a "Refraction Hospital" for which "the expenses of the first year would not exceed £250," and on the lines of the "London Refraction Hospital." This so-called hospital is no more than a meeting place where opticians collect some few patients, examine their eyes according to their capacity, and instruct their neophytes in their methods. The inwardness of this device of the opticians would seem to be an attempt to combat the finding of the report of the Departmental Committee on the causes and prevention of blindness: "There is only one place where ophthalmology can be learnt; that is at a hospital," and so apparently the opticians devise a "hospital" so that they may claim to be "hospital" trained! The device is on a par with their profuse use of high-sounding titles of "optologist," "ophthalmologist," "qualified ophthalmic optician," and of strings of letters, which they bestow on one another. Since Scots have some reputation for a choice use of words, one might have hoped that the opticians of Glasgow would have refrained from this flagrant misuse of the word "hospital."—I am, etc.,

London, W.1, Oct. 22nd. N. BISHOP HARMAN.

INFECTIVITY OF JUVENILE WARTS.

SIR,—A few years ago I had under treatment a woman who had a wart on the right index finger and another on the thumb of the same hand, the two warts opposing one another as if from contact inoculation. The appearance of these warts did not suggest verrucose tuberculosis. The patient, who had been a "land girl" in Cheshire during the war and for some time after, said that she had acquired these warts from her work as a milker; occasionally a cow had a warty teat, and during the milking "if you make it bleed, that's where you catch it yourself"—that is, on the hands or fingers.

Dr. Prosser White believes that this transmission of warts from cattle to mankind has never been recorded previously in this country, although there are numerous references to it in Continental medical writings. In the second edition of his monograph on *Occupational Affections of the Skin* (second edition, 1920, p. 261) he refers to a paper by Audry and Suffran in the *Annales de Dermatologie et de Syphilis* (1908, p. 545), in which it is stated that the common warts of oxen and of dogs are communicable to man. He also refers to a paper by F. Schultz on the experimental transmission of warts from cats to the human subject, in the *Deutsche medizinische Wochenschrift* for 1908.

I am told by a farmer that warts are rather common on cows' teats, even on heifers which have never calved. It would appear that the cow is not simply infected from warts on the hands of a milker, and transmits the infection subsequently to another milker. The cow seems to have a definite predilection for infective warts, and may possibly be the first stage in the cycle of infection; otherwise they would not be met with on heifers before handling by the milker.

My patient's observation that the warts became infective if they were made to bleed is fully borne out by the case of ordinary juvenile warts on the human subject. In Manchester, for instance, children have a folk-lore belief that they can get rid of warts if they can "sell them for a halfpenny." This, apparently, they have no difficulty in doing, as some small boys seem quite proud to have a wart or two about their fingers somewhere: it confers quite a distinction upon them. The infection, sold to the recipient, is transferred by rubbing against the wart after making it bleed.

This raises the question as to whether warts can be transferred to children and others through drinking raw (unboiled) milk. Certainly milk is predominantly a food of children, and warts are typically an affection of childhood; blood cells can be found with fair frequency in samples of milk, and the cows which supply the milk for human consumption may have on their udders infective warts, capable of transmitting the infection to human beings if the warts are made to bleed. A prima facie case for suspicion seems to exist, though it is perhaps unsafe to put it more strongly at present.—I am, etc.,

Manchester. W. J. RUTHERFURD, M.D.Glasg.

BIRTH CONTROL INVESTIGATION COMMITTEE.

SIR,—There is no reasonable doubt that birth control is practised by a large number of married people of all classes. It is to be supposed that the usage may have important effects on the physical, psychological, and ethical well-being, not only of the individuals who employ it, but also indirectly on the well-being of the children of those persons, and therefore of the whole community. It is also probable that if birth control is desirable some methods are to be preferred to others, yet up to the present little scientific study has been made, either of the comparative advantages of different methods, or of the possible far-reaching effects of the practice as a whole.

The subject of birth control has hitherto not formed part of medical education, and, generally speaking, any professional knowledge that medical practitioners may have of this question has been acquired in response to a demand from their individual private patients. In hospitals and medical schools general instruction in this subject is not as a rule given to the students, nor information to patients. Yet it is well known that in certain cases of ill health further pregnancies are clearly contraindicated on medical grounds alone.

A committee composed of scientific workers and members of the medical profession, assisted by lay workers and others interested in the problem, has been formed to promote the scientific investigation of birth control. The members of the committee differ widely in their opinions as to the desirability of birth control, but are united in the realization that the practice is widespread, and that the scientific problems which it raises can no longer be ignored.

It is realized that the results of the investigation may show that no entirely satisfactory method has at present been discovered, and work is being done to find new methods. It is hoped also that relations may be established with clinics and other organizations connected with birth control abroad, so that their experience and knowledge may be used.

The committee serves no propagandist function, but desires only to establish facts and to publish these facts as a basis on which a sound public and scientific opinion can be built. The present division of medical and scientific opinion and the lack of any orthodox medical teaching on the subject are largely explained by the absence of available data on which a sound opinion can be formed.

The committee will be grateful if any of your readers who may be interested in the subject, or who possess data

that would yield information, would communicate with the honorary secretary of the committee, the Hon. Mrs. Marjorie Farrer, 41B, Clanricarde Gardens, London, W.2.

A questionary has been prepared by the committee which, if filled in in sufficient numbers and in a sufficient variety of cases, will provide that quantity of accurate statistical information which is now lacking. As many of these questionaries as may be required will be sent to any private doctor, hospital, welfare centre, or infirmary on application to the honorary secretary of the committee.—I am, etc.,

HUMPHRY ROLLESTON,
October 25th. Chairman.

*** The other members of the committee are: E. D. Adrian, M.D., F.R.S., C. P. Blacker, M.B., C. J. Bond, C.M.G., F.R.C.S., Professor A. M. Carr-Saunders, Frank Cook, F.R.C.S., Mrs. Gladys Cox, M.B., B.S., Professor Winifred Cullis, D.Sc., Professor Arthur Ellis, M.D., Professor Julian Huxley, and Professor F. H. A. Marshall, D.Sc., F.R.S.

CONVULSIONS DURING GENERAL ANAESTHESIA.

SIR,—Since I wrote on this subject in the JOURNAL of May 28th (p. 956) you have published letters containing statements with which I disagree.

The convulsions could not be confused with ether clonus by anyone who has witnessed both, and it is a pity that one or two of your correspondents should, by doing so, obscure the issue. They are probably quite easily distinguishable also from those due to atropine, which, however, I have never seen as far as I know. I do not believe they are due to impurities, because I have seen them begin, and heard of a fatality where only ether, fresh from a bottle, and of a very good brand (B.D.H.), was used.

Neither are they due to the bomb, because many have occurred where this method was not employed (and four of those which I reported). I may add that three of the five deaths that I wrote of occurred under other methods. As I invented the bomb I should like to contradict the suggestion that it is liable to cause chest complications. Possibly, by making ether easy, administrators have been tempted to use that drug more often, and in fuller measure than they would otherwise have considered judicious. I have used it continually during these ten years, and I find that it is not so.

My experience of this phenomenon makes me adhere to my original suggestion as to its cause; and the administration of CO_2, I believe, would make matters worse.—I am, etc.,

Manchester, Oct. 8th. K. B. PINSON.

CONVULSIONS DURING LOCAL ANAESTHESIA.

SIR,—About six months ago I administered a local anaesthetic—codrenine—to a woman, aged 45, for the removal of a large lipoma from her right side. After about five minutes she had a most violent epileptiform attack. Her face became purple, and it gave us all we could do to hold her on the table. As I thought that she might have some intolerance to cocaine I at once made my incision and quickly removed the growth. She came to just as I had finished, got off the table, and walked to her room. She had never had a fit of any kind before, nor has she had one since, but she remembers everything about the seizure. I have given this same local anaesthetic in hundreds of cases, but never had an experience like this. What is the explanation?—I am, etc.,

Bourton-on-the-Water, Glos, Oct. 19th. PROSPER LISTON.

SECOND ATTACK OF PITYRIASIS ROSEA.

SIR,—I am obliged to Dr. E. Graham Little for pointing out a mistake of mine in my memorandum on a second attack of pityriasis rosea (September 24th, p. 549). The date of his own case was, of course, 1914, and not 1915, as I have it.

Dr. Graham Little says that he thinks "the implication of infection conveyed by Dr. Edelston's experience equally uncommon"; and he is surely right. This was a point which intrigued me very much, and it would be interesting and instructive to know if any similar cases have ever occurred, in which the disease seemed to be so conveyed from one to another.—I am, etc.,

Manchester, Oct. 10th. B. GORDON EDELSTON.

SIR,—May I add my experience to that which has been described by Dr. Gordon Edelston (September 24th, p. 549). When I was a student at St. Thomas's Hospital (about 1905) I found one day an eruption on my chest and arms, and went to the skin department and showed myself to Dr. Stainer. By a herald spot on my arm and the character of the lesion he diagnosed pityriasis rosea. On my asking about treatment and prognosis, Dr. Stainer told me that I should never have a second attack. About one year later I found myself to my great surprise exhibiting an eruption exactly similar to the previous one. I showed it to Dr. Stainer, who was greatly interested, and diagnosed it as pityriasis rosea occurring a second time.—I am, etc.,

Ryde, I.W., Oct. 13th. SPENCER CHURCHILL.

A PAROXYSM OF AURICULAR FIBRILLATION.

SIR,—In the memorandum by Dr. Brewis on "A paroxysm of auricular fibrillation" (October 1st, p. 595) he makes the statement "the auricular systole was distinctly heard." Dr. Brewis is not alone in repeating such a statement, but if such a fact be not within the region of even possibility it is time that those responsible for teaching that it is should either give reason for the faith that is in them or recant. A statement of this sort detracts seriously from the value of the other statements in the memorandum.

Until we are satisfied as to the cause of the normal heart sounds it is absurd to speculate as to the cause of the abnormal heart sounds. As I have pointed out on several occasions the vibrations of the auricle even when fibrillating are so few per second as to be incapable of producing a sound audible by the human ear. I am convinced that the sounds of the heart are produced by the movements of the pericardial fluid, and any variations of those sounds are associated with variations in the quantity and quality of that fluid together with a diminution of the negative pressure within the pericardial cavity.—I am, etc.,

Swansea, Oct. 1st. G. ARBOUR STEPHENS.

PYREXIA DURING THE PUERPERIUM.

SIR,—I should like to add my protest to that of your other correspondents against this new order—that we shall notify as puerperal fever any case of a lying-in woman who has a temperature of 100.4° for more than twenty-four hours. This is a form of legislation which can only bring derision on the medical profession; it is a waste of public money and a very unjust and ridiculous order. Mr. Chamberlain should be made to justify this new hare-brained regulation. The Registrar-General's statistics will be more than funny if every woman with a headache and temperature due to mammary irritation or constipation is notified as suffering from puerperal fever.—I am, etc.,

IAN JEFFERISS, M.R.C.S., L.R.C.P.,
Totnes, Oct. 11th. Medical Officer of Health.

The Services.

NO. 14 STATIONARY HOSPITAL.

THE eighth annual dinner of the medical officers of No. 14 Stationary Hospital will be held on Friday, December 9th, at the Trocadero Restaurant, at 7.15 for 7.45 p.m.

DEATHS IN THE SERVICES.

LIEUT.-COLONEL LEWIS CAMERON, Bengal Medical Service (retired), died in a nursing home at St. Heliers, Jersey, on October 17th, aged 85. He was born on June 18th, 1842, the son of Mr. Donald

Cameron, of the Excise department, Knockando, Elgin, and educated at Edinburgh, where he graduated as M.D. in 1863, also taking the L.R.C.S.Ed. in the same year. He entered the I.M.S. as assistant surgeon on March 31st, 1866, passing first into Netley, became surgeon major on March 31st, 1876, and retired on August 9th, 1891. His whole service was passed in civil employment in the province of Bengal, where he was civil surgeon successively of Backerganj, Champarun, Rajshahai, and Midnapur. He leaves a widow.

Medico-Legal.

AN OSTEOPATH'S CLAIM FOR FEES.

In the British Medical Journal of March 5th (p. 448) a short report was given of the action brought by Mr. E. L. Macnaghten of Weymouth Street, London, in the Bloomsbury County Court, claiming £30 9s. for osteopathic treatment rendered by him to the wife of the defendant, Mr. C. H. Douglas. The defendant pleaded that the plaintiff's diagnosis of the case was entirely wrong, that the treatment given was unnecessary and unsuitable, and also relied upon the provisions of Section 32 of the Medical Act, 1858:

"No person shall be entitled to recover any charge in any court of law for any medical or surgical advice, attendance, or for the performance of any operation, or for any medicine which he shall have both prescribed and applied, unless he shall prove upon the trial that he is registered under this Act."

Deputy Judge Stoker held that as the plaintiff was not a registered medical practitioner he could not recover fees for advice and treatment, and entered judgement for the defendant, with costs. The plaintiff appealed to the King's Bench Division, and the hearing was reported in the Journal of May 21st (p. 940). Their lordships, Acton and Talbot, JJ., ordered a new trial on the ground that they were bound by the decision of Horridge and Shearman, JJ., in the case Hall *v.* Trotter, that an osteopath was entitled to recover fees for treatment rendered.

The action was tried anew in the Bloomsbury County Court by Judge Hill Kelly on October 19th. The plaintiff was represented by Mr. A. C. Jackson; and the defendant by Mr. Malcolm Hilbery and Mr. Laporte Payne, instructed by Messrs. Blewitt and Son.

The plaintiff described his treatment of Mrs. Douglas and the findings upon which this treatment was based. It appeared that he had found evidence of suppuration in the antrum, approximation of the first and second cervical vertebrae, displacement of the coccyx, and half an inch of shortening of one leg. His treatment included movement of the cervical vertebrae, reduction per rectum of the displaced coccyx, and administration of ultra-violet rays. In cross-examination he was understood to say that he did not know the dosage of ultra-violet rays, and agreed that osteopathic treatment was worthless if the suffering could not be relieved by moving bones.

Sir Herbert Waterhouse, consulting surgeon to Charing Cross Hospital, who gave evidence on behalf of the defendant, said that the movement of bones in this case could have had no effect whatever on the antrum. He had examined Mrs. Douglas and found each antrum perfectly normal by transillumination, and there was no evidence of previous antral disease. It was quite impossible to move a dorsal or lumbar vertebra, and very dangerous to attempt to move a cervical vertebra. Clinical and *x*-ray examination showed the spine to be normal. The coccyx could not have been moved by the plaintiff without an anaesthetic on account of the intense pain that would have been caused. There was no evidence of any shortening of one leg, and, speaking generally, Sir Herbert Waterhouse expressed the opinion that Mrs. Douglas had had nothing the matter with her calling for special treatment.

Mr. Frank Romer, M.R.C.S., who said he had specialized in what was known as manipulative surgery, expressed the opinion that the bones stated to have been moved by the plaintiff could not be moved. He concurred in the evidence given by Sir Herbert Waterhouse.

Dr. W. J. C. Keats of Wanstead, who also agreed with what Sir Herbert Waterhouse had said, stated that he had been Mrs. Douglas's regular medical attendant and had examined her in May last year. He thought the osteopathic treatment she had been receiving was wholly useless and that she had derived no benefit from it.

The defendant (Mr. Douglas) in his evidence said that he informed the plaintiff by letter in June that he had stopped his wife's visits to him because he was not satisfied with the treatment she had been receiving. After two or three visits she seemed to be a little better, but subsequently became worse.

Mrs. Douglas, who also gave evidence, said that she went to plaintiff on the recommendation of a friend to get rid of faceache, and he told her he could make her better. She felt better after two or three visits to him in April, but after that her condition became worse and she stopped going to him because he was doing her no good. She had complained to plaintiff that his treatment was rather drastic and that once she nearly fainted on her return home.

His Honour said that he was satisfied that the treatment given by Mr. Macnaghten to Mrs. Douglas could not have achieved any beneficial results, and he had come to the conclusion that the services rendered by him were wholly useless. He accordingly gave judgement for the defendant, with costs.

Universities and Colleges.

UNIVERSITY OF OXFORD.

At a congregation held on October 20th the following medical degrees were conferred:

B.M.—C. L. Cope, P. C. Mallam.

UNIVERSITY OF CAMBRIDGE.

Mr. Ernest Clarke, C.V.O., formerly an exhibitioner of the college and assistant demonstrator of anatomy in the University, has been elected an honorary fellow of Downing College. He graduated M.B.Lond. in 1881, M.D. in 1885, and became F.R.C.S.Eng. in 1894. He is consulting surgeon to the Central London Ophthalmic Hospital, and has been President of the Ophthalmological Section of the Royal Society of Medicine.

The Raymond Horton-Smith Prize for the best M.D. thesis during the past academic year has been awarded to V. B. Wigglesworth, M.A., B.Ch., of Caius; *proxime accessit*, A. E. Roche, M.A., M.D., M.Ch., of Magdalene.

UNIVERSITY OF EDINBURGH.

At a graduation ceremony on October 22nd the Diploma in Public Health was conferred upon the following:

W. T. de Silva, E. F. Dott, R. A. Macdonald, D. P. MacIver, *M.C.*, J. Macleod, Elizabeth P. M'Whirter.

ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

At the meeting of the Royal College of Surgeons of Edinburgh held October 19th Dr. Alexander Miles was elected president for the ensuing year, Dr. A. Logan Turner vice-president, and Mr. John William Struthers, F.R.C.S.Ed., secretary and treasurer.

The following twenty-five successful candidates out of ninety-three entered, having passed the requisite examinations, were admitted Fellows:

J. M. Bassett, W. A. Blomfield, W. M. Brown, J. H. Couch, A. F. W. da Costa, H. Dass, G. F. Duggan, Caroline A. Elliott, G. M. Irvine, W. H. G. M. Ling, H. C. Lowry, R. R. Macintosh, I. Macpherson, R. B. Martin, R. S. Melville, A. J. Murray, J. S. Ramage, R. K. Rau, E. J. Ryan, R. V. N. Selvadurai, M. A. Swan, T. E. Stoker, B. M. G. Thomas, J. Troup, J. N. Young.

UNIVERSITY OF DUBLIN.

School of Physic, Trinity College.

The following candidates have been approved at the examination indicated:

Final Examination.—*Part I, Materia Medica and Therapeutics, Medical Jurisprudence and Hygiene, Pathology and Bacteriology*: M. H. Fridjhon, R. St. J. Lyburn, H. T. Fleming, W. R. Johnston, J. N. U. Russell, J. E. C. Cherry, A. J. Garde, R. M. Wilson, C. R. Harris, R. I. Reid, C. King, J. F. K. MacCarthy-Morrogh, A. H. O'Malley, Anna M. J. M'Cabe, F. S. Mackenna.

D.P.H.—*Part II, Sanitation, Public Health Administration, Hygiene and Epidemiology, Sanitary Law and Vital Statistics*: Kathleen M. Kennedy, M. Halligan, Sarah M Coghlan, Brenda M. Young.

ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Calendar for 1927-28.

The College *Calendar* for the current year includes, as usual, a report of the proceedings of Council during the past twelve months. A large part of the matters recorded therein have formed the subject of notes in this column from time to time.

In regard to the primary Fellowship examination it has been decided that no alteration shall be made at present in the subjects of this examination, and that no exemptions of any kind shall be granted. The Council has, however, resolved that it is desirable to send examiners to the Dominions to conduct a primary examination for the Fellowship of the same standard as the examination in this country, on conditions to be hereafter determined, provided that satisfactory arrangements can be made. To this end negotiations with the proper authorities in Canada have been authorized. The fees for admission to the diploma of Fellow have been revised; in future, besides the examination fees, a member will pay 10 guineas on admission, and a non-member 30 guineas. Under the authority given by the recently granted Supplemental Charter the Court of Examiners has been increased from ten members to twelve.

In the period under review 60 diplomas of Fellowship were issued, including one to a medical woman; 700 diplomas of Membership, including 117 to women; and 139 licences in dental surgery, including 12 to women. The following diplomas were granted jointly with the Royal College of Physicians: Public Health, 53; Tropical Medicine and Hygiene, 49; Ophthalmic Medicine and Surgery, 40; Psychological Medicine, 22; Laryngology and Otology, 19.

The subject of the Jacksonian Prize for 1928 is the surgical treatment of pulmonary tuberculosis. The prize for 1926 was awarded to Mr. E. Miles Atkinson.

Mr. G. Buckston Browne has given a sum of £5,000, the interest from which is to be expended in providing an annual dinner on the College premises for Fellows and Members and such others as

the President and Council may wish to invite, at least half the guests invited to be Members of the College.

The report on the work of the Museum records that the greatly extended odontological collection was opened by the President on May 23rd; Sir Berkeley Moynihan's speech was published in full in our issue of May 28th, p. 978. In January, on the initiative of the President, a large party of medical students from Leeds spent a day examining the contents of the Museum, and the hope is expressed that students of other provincial universities and medical schools may be induced to follow this example. During the year rapid progress has been made in the laborious work of preparing a new descriptive catalogue.

The library report states that the librarian is now engaged upon the compilation of a catalogue of all the manuscripts in the library, including many bearing on the history of the Museum and College at large. The "Lives of the Fellows" have been kept up to date.

Notice is given that the annual meeting of Fellows and Members will be held at the College, Lincoln's Inn Fields, on Thursday, November 17th, at 3 o'clock, when the Council's report will be presented.

ROYAL COLLEGE OF PHYSICIANS OF IRELAND.

Election of Officers and Fellows.

At the annual stated meeting of the President and Fellows, held on St. Luke's Day, Tuesday, October 18th, the following candidates nominated on July 1st were duly elected Fellows of the College: Geoffrey Bewley, M.D.Dubl. (1925), M.R.C.P.I. (1926); Charles Greer, M.R.C.P.I. (1911); Jiwan Ram Maleri, M.R.C.P.I. (1925); James Sinclair Quin, M.D.Dubl. (1925), M.R.C.P.I. (1925).

Dr. William Arthur Winter, M.D.Dubl., D.P.H., was elected President of the College in succession to Professor T. H. Wilson.

The following Fellows were elected Censors of the College: Medicine: Dr. Callaghan, Dr. Synge. Medical Jurisprudence and Hygiene: Dr. Bigger. Midwifery: Dr. Solomons.

The President appointed Dr. Solomons a Vice-President of the College.

The election of officers resulted as follows: *Representative on the General Medical Council:* Sir John Moore. *Treasurer:* Dr. Bewley. *Registrar:* Dr. Kirkpatrick. *Librarian:* Mr. R. Phelps. Dr. John Speares was elected Deputy for the King's Professor of Materia Medica and Pharmacy to act as Physician at Sir Patrick Dun's Hospital.

As representatives of the College on the Committee of Management under the Conjoint Examination Scheme the following Fellows were elected: Dr. Walter Smith, Sir John Moore, Dr. Kirkpatrick.

Annual Dinner.

In the evening the annual St. Luke's Day dinner was held, when the newly elected president was in the chair. A large number of guests were entertained, including the Chief Justice, the Provost of Trinity College, the Presidents of the Royal College of Surgeons in Ireland, of the Royal Academy of Medicine, of the Incorporated Law Society, of the Royal Hibernian Academy, of the Royal Society of Architects, and of the Chamber of Commerce, as well as the Dean of St. Patrick's, the Very Rev. Father Finlay, and the Archdeacon of Dublin. A telegram of salutation was sent to the Royal College of Physicians of London and duly acknowledged.

CONJOINT BOARD IN SCOTLAND.

The following candidates have been approved at the examination indicated:

Final Examination.—Out of 105 candidates entered the following have passed: M. M. Wright, F. A. Huttner, T. Lotter, M. A. H. Gohar, K. R. Bali, G. D. Roche, M. M. Farghaly, K. R. Trembath, P. M'K. Logan, S. Jurawan, T. B. Dobson, S. K. Ponniah, R. C. Adhikari, J. S. T. Isbister, G. M. Johnson, C. D. C. Golding, A. A. Huse, S. Sivalingam, R. Kandiah, S. Kanagalingam, I. Gurland, E. A. Bulankulame, A. W. Green, B. D. Rao, W. Campbell, A. C. Lovett-Campbell, W. Jackson, J. W. A. M'Guinness, A. S. Gordon, T. A. W. Wilson, W. T. A. Pearce, T. C. Yan, G. W. Milledge, W. Ainslie, A. B. Xuma.

The following have passed in the subjects indicated:

Medicine: E. S. R. Menon, M. R. Ramjohn, A. B. Anderson, H. F. N. Slane, R. G. Paranyape, B. J. Ess, S. Chelliah, V. Sinnetamby, J. E. Felix. *Surgery*: D. A. Herd, F. H. E. J. Masilamani, M. Klar, W. Wallace. *Midwifery*: D. A. Herd, C. A. Munro, Agnes Donaldson, E. S. R. Menon, S. S. Nagi, A. B. Anderson, H. F. W. Slane, S. Chelliah, J. M. Chittambatam, H. M. C. de Silva, G. R. Gardner. *Medical Jurisprudence and Public Health*: G. Henderson, N. J. W. Smith, M. I. Mullen, E. L. Fraser, A. J. de Villiers, R. G. Paranyape, G. W. Campbell, M. Lessnoff, W. Kelly.

SOCIETY OF APOTHECARIES OF LONDON.

The following candidates have been approved in the subjects indicated:

Surgery.—R. P. Charles, H. J. Harcourt, B. D. Jain, D. I. Jones, T. M. Joseph, L. M. Sanders.

Medicine.—J. D. Evans, G. Furniss, S. Goldman, F. G. Hardaker, A. W. Lassowsky, J. D. Ritchie, G. C. Rhys-Jones, S. Slotar.

Forensic Medicine.—H. B. Blaker, J. D. Evans, T. M. Joseph, J. D. Ritchie, B. Rosenzvit, A. E. Vawser, L. Wasef.

Midwifery.—G. E. Bent, H. B. Blaker, H. M. Feldman, D. I. Jones, A. A. Leibovitch, H. T. Rylance, V. R. Smith.

The diploma of the Society was granted to Messrs. R. P. Charles, J. D. Evans, S. Goldman, F. G. Hardaker, B. D. Jain, G. C. Rhys-Jones, J. D. Ritchie, B. Rosenzvit, S. Slotar, and V. R. Smith.

Obituary.

Dr. David Rutherford Adams, physician to the Whiteclif Tuberculosis Hospital, Torquay, and pathologist to the Torbay Hospital, died of pneumonia in a nursing home in Torquay on October 17th at the early age of 40. He graduated M.B., Ch.B.Glasg. in 1910, and M.D. with commendation four years later. He had held resident appointments in the Glasgow Royal Infirmary and in the City Fever Hospitals, and had been engaged for a time in pathological work in the Western Asylums Research Institute. After a period as assistant surgeon to the Kilmarnock Infirmary, Ayrshire, he held a commission in the R.A.M.C., and served on the Salonika and Italian fronts. On his return from the war he began practice in Torquay, first in partnership with Dr. Ambrose Spong and later with Dr. D. G. Riddell; his professional ability and social gifts rendered him very popular. He is survived by a widow and four children.

Dr. John Rudd Leeson, mayor of Twickenham, died on October 23rd, in his 74th year. He received his medical education at St. Thomas's and Edinburgh, and also studied in Vienna and Berlin. As a student he worked in Lister's wards in the Edinburgh Royal Infirmary, and his book, *Lister as I Knew Him*, was reviewed in our columns on April 16th, 1927 (p. 728). He obtained the M.R.C.S.Eng. in 1875, and graduated M.B., C.M.Ed. in the following year, proceeding M.D. in 1882. He had held the appointments of senior consulting physician to the St. John's Hospital, Twickenham, and consulting physician to the Metropolitan and City Police Orphanage. He was a divisional surgeon of the St. John Ambulance Brigade, and a Fellow of the Royal Astronomical, Royal Microscopical, Geological, and Linnean Societies. Dr. Leeson retired from active medical work several years ago, and since then had devoted his life to public work in Twickenham, becoming its first mayor when this town was incorporated as a borough last year. He was a Justice of the Peace for the county of Middlesex.

Medical News.

The following appointments made to the staff of the London School of Hygiene and Tropical Medicine took effect on October 1st: Mr. Reginald Lovell, M.R.C.V.S., to be research assistant in comparative pathology; Mrs. M. M. Smith, M.A., to be demonstrator in bacteriology; Miss H. M. Woods, F.S.S., to be assistant lecturer in the division of epidemiology and vital statistics. Mr. W. Rees Wright, M.Sc., has been appointed to a temporary research post, to continue Dr. P. A. Buxton's investigations on the biology of stegomyia.

As already announced, a dinner to celebrate the incorporation of the British Institute of Radiology with the Röntgen Society will be held at the Hotel Great Central, Marylebone Road, on Friday, November 18th, with Sir Humphry Rolleston in the chair. As was made quite clear in a paragraph published on October 15th (p. 697) the two societies have amalgamated on equal terms. The present officers of the British Institute of Radiology whose names were mentioned in the paragraph are retiring, and will be replaced by officers to be elected at a general meeting on November 17th of members of the new society formed by the amalgamation.

The Woolwich and District War Memorial Hospital at Shooters' Hill will be formally opened on Wednesday next, November 2nd, at 2.45 p.m., by H.R.H. the Duke of York, who will be accompanied by the Duchess of York. A preliminary account of the new buildings appeared in our issue of May 14th, p. 892.

The National Association for the Prevention of Infant Mortality and for the Welfare of Infancy has arranged a course of lectures on the hygiene of married life and parenthood (for married people only) to be given in the Lecture Hall, Carnegie House, 117, Piccadilly, on Wednesdays from November 2nd to December 7th, at 8.30 p.m. The subjects and lecturers are as follows: Physiology of the reproductive organs, Professor Winifred Cullis; hygiene of pregnancy—from the mother's and the father's points of view, Lady Barrett; how a new life begins and what it owes to its ancestry, Dr. J. S. Fairbairn; contraception, Dr. Eric

Pritchard; the effect of discipline on mental development, Dr. C. W. Kimmins; sterility, by Professor Louise McIlroy. Fees: 7s. 6d. for the course for one person, or 10s. 6d. for husband and wife; 1s. 6d. for a single lecture. Tickets may be had from the secretary of the Association, 117, Piccadilly, W.1.

THE Fellowship of Medicine announces that Mr. Lawrence Abel will deliver a lecture on points in the diagnosis and treatment of pyuria at the Medical Society, 11, Chandos Street, Cavendish Square, on October 31st, at 5 p.m. On the same afternoon Dr. Donald Paterson will give a medical demonstration at the Great Ormond Street Hospital at 2.30 p.m., and Mr. Bright Banister a surgical demonstration at the Chelsea Hospital for Women at 2 p.m. The lecture and demonstrations are free to medical practitioners. Two courses begin on October 31st; one, lasting four weeks, will be held at the London Lock Hospital, and the other, a late afternoon course for general practitioners, will continue at the Hampstead General Hospital for two weeks. From November 7th to 12th the Hospital for Diseases of the Chest, Brompton, will provide a comprehensive course, and there will be a clinical course at St. Peter's Hospital from November 14th to 26th, with a series of lectures on diseases of the urinary tract. From November 14th to December 3rd a course in medicine, surgery, and gynaecology will be held at the Royal Waterloo Hospital. From November 21st to December 17th the West End Hospital for Nervous Diseases will give a series of clinical demonstrations upon selected cases in the out-patient department in Welbeck Street daily at 5 p.m., and there will be a course for general practitioners at the London Temperance Hospital during the two weeks following November 21st, from 4.30 to 6 p.m. A course in proctology at St. Mark's Hospital will extend from November 28th to December 3rd. Copies of syllabuses of these courses and of the *Post-graduate Medical Journal* are obtainable from the Secretary of the Fellowship of Medicine, 1, Wimpole Street, W.1.

A COURSE of post-graduate lectures at Ancoats Hospital, Manchester, opened on Thursday last, when Mr. H. E. Hughes discussed the early diagnosis of intestinal obstruction. On November 10th he will deal with gall stones, and on November 24th with the diagnosis and treatment of common ailments of the rectum. On November 3rd Dr. Kletz will discuss diarrhoea, and on November 17th the medical treatment of peptic ulcer. The lectures, which begin at 4.15 p.m., are open without fee to medical practitioners and senior students; tea will be served at 3.45 p.m.

DURING November a series of lecture-demonstrations will be given twice a week, at 4.30 p.m., at the West London Hospital Post-Graduate College, free to medical practitioners. On November 1st Dr. Sydney Owen will deal with infant feeding, and on the 8th with the heart in childhood; on November 4th Mr. Neil Sinclair will speak on gall stones, and on the 16th Dr. G. B. Dowling will discuss the preservation of a youthful skin. Mr. Tyrrell Gray will give two lectures on gastric and duodenal ulcer, the first being on the 17th and the second on the 24th. On November 22nd Dr. Scott Pinchin will speak on cardiac irregularities, and on the 30th Dr. Carter Braine will consider the therapeutic application of x rays. A staff consultation will be held on November 11th, at 5 p.m., in the massage department.

THE Prince of Wales opened the new extension of the Boscombe Branch of the Royal Victoria and West Hants Hospital on October 19th. He named the new ward, which has been specially adapted for sunshine treatment, as the Prince of Wales's Ward.

THE annual dinner of the Chelsea Clinical Society was held on October 25th; Dr. L. D. Bailey, *M.C.*, the president, took the chair, and there was a good attendance of members. The toast of "The Society" was proposed by Alderman J. E. Jefferson Hogg, ex-mayor of Chelsea, and the president, in acknowledging it, referred to the flourishing state of this fraternity, which was now in its twenty-ninth year. The membership was 158, and the standard of interest of the meetings was well maintained. The toast of "Kindred Societies" was proposed by Dr. F. J. McCann in a humorous speech, and Mr. Mortimer Woolf, president of the Hunterian Society, replied. Mr. Ivor Back added to his reputation in a witty speech, proposing the health of "The Guests," replies being made by Sir William Orpen, R.A., who showed that brevity could be the soul of wit; Mr. Leonard Huxley, LL.D.; Mr. J. Hugh Edwards, M.P., who indicated, with many sly jests and epigrams, the value of the medical profession to the nation as a whole; and the Hon. Alan Hogg, who spoke of the part played by medical practitioners in building up the Empire overseas. The toast of "The President" was proposed by Dr. Ernest Young, and in his reply Dr. Bailey referred to the valuable work of the officers of the society, including the treasurer, Dr. K. E. Eckenstein, who replied succinctly and effectively.

THE annual dinner of the London Hospital was held at the Trocadero Restaurant on October 20th, when more than 200 old members and guests were present. The chairman, Dr. Angus Kennedy, proposing the toast of "The hospital," referred to the excellence of the training, the remarkable spirit of self-reliance which it encouraged, and the devotion to its memory of all its old students. He regretted that the hospital no longer opened its doors to women students. Dr. Russell Andrews, proposing the health of the chairman, mentioned that Dr. Kennedy's grandfather, father, son, and daughter had all graduated from the London Hospital. He referred to the number of instances in which several generations had passed through the medical school, which afforded sure testimony of their appreciation of the training there.

THE annual autumn meeting of the Society for the Propagation of the Gospel in Foreign Parts was held at the Central Hall, Westminster, on October 25th. The speakers, who dealt principally with medical missions, included the Bishops of London and Woolwich, Dr. D. S. Bryan Brown of the Mosse Memorial Hospital in North China, and Miss B. E. Corbett, a member of the medical mission in Malacca, Straits Settlements.

THE Ministry of Health has issued new regulations replacing the Public Health (pneumonia, malaria, dysentery, etc.) Regulations, 1919, which provide for the notification and treatment of certain infectious diseases. Malaria and dysentery, as well as acute primary pneumonia or acute influenzal pneumonia, must be notified in the prescribed form irrespective of previous notification. Special provision is made for cases in which malaria has been used for therapeutic purposes; such cases occurring in an institution need not be notified, but if the medical practitioner is of opinion that the patient may be regarded as liable to relapses of malaria at the time he is discharged from the institution notification must be sent to the M.O.H. for the district in which the patient proposes to reside. The fee for a notification is, for a private patient, 2s. 6d., for a case occurring in the practice of the medical officer of any public body or institution, 1s.

DR. D. W. SAMWAYS (Topsham, Devon) wishes again this year to direct attention to the fact that professional men whose means are limited requiring a change are received into the Home of Rest at Mentone at the charge of 30s. a week for board and lodging. The committee are prepared to give special consideration to the cases of those unable to pay this amount. The stay of each person is limited to three months. The home, which is open from November 1st to May 1st, is a philanthropic undertaking intended to help professional men who break down temporarily, and is therefore useful to medical practitioners of small means, or their professional patients in like case. Applications should be made to the lady superintendent, Miss Goldee, or to the honorary physicians, Dr. Stanley Rendall or Dr. Samways, at Mentone, Alpes Maritimes, France.

THE Central Council for Health Education is publishing a monthly periodical entitled *Better Health*, with a view to providing instruction in health matters for the public. The November issue contains an article by Sir George Newman on the relation of food to health, and other subjects dealt with include the care of milk in the home, the relation of air and ventilation to health, and the work of the Public Health Department. This publication is well and simply written, and should be of great value in spreading information about the prevention of disease. The annual subscription is 1s. 6d., post free, and copies may be obtained from the Society of Medical Officers of Health, 36/38, Whitefriars Street, E.C.4.

DR. RICHARD ARTHUR of Sydney, who is Minister of Health in the New South Wales Government formed by Mr. Bavin, following the resignation of Mr. Lang, the Labour Premier, studied medicine at the University of Edinburgh, where he took the degrees of M.B., C.M. in 1888 and M.D. in 1891; he is also M.A. of St. Andrews. He is a member of the Legislative Assembly of New South Wales and a member of long standing of the New South Wales Branch of the British Medical Association; he is surgeon to the Ear and Throat Department of the Sydney Hospital.

UNDER the title *Sale of Food and Drugs Acts* a pamphlet has been issued by H.M. Stationery Office, at the price of 1s. 6d., containing extracts from the Annual Report of the Ministry of Health for 1926-27 relating to this subject, together with an abstract of Reports of Public Analysts for the year 1926. The Ministry's Report from which these are taken was noticed in our issue of September 24th (p. 558).

As a large number of applications are received at the Frederick Andrew Convalescent Home, The Manor House, West Malling, Kent, from persons who are ineligible, we are asked to remind possible applicants that the three weeks' free convalescence can only be given after definite acute illness to ladies of better education, who are earning their living in professional or analogous occupations.

ON the occasion of the international conference on rabies, recently held in Paris, an international society for microbiology was founded, with Professor Jules Bordet of Brussels as president, and Professor Rudolf Kraus of Vienna, Drs. Dujarric de la Rivière and Plötz of Paris as secretaries.

THE annual report for 1926 of Earl Haig's British Legion Appeal Fund includes an account of the British Legion Sanatorium and Settlement at Aylesford, Kent. On March 1st, 1927, there were 142 patients in the sanatorium, and nearly 200 passed through the treatment centre in 1926. The report, which contains detailed information about the organization and results of the sixth annual Poppy Day appeal, may be obtained from the British Legion Appeals Department, 26, Eccleston Square, S.W.1.

POST-GRADUATE courses on diseases of the heart and circulation will be held in Vienna, from November 28th to December 10th. Further information may be obtained from Dr. A. Kronfeld, Porzellangasse 22, Vienna IX.

THE Scottish Board of Health has issued as separate reprints the chapters in the annual report of the Board for 1926 relating to (*a*) encephalitis lethargica, (*b*) ultra-violet ray therapy, and (*c*) Schick and Dick tests in diphtheria and scarlet fever. The reprints have been issued at the nominal price of 2d. each, or post free, 2½d. Copies can be obtained through any bookseller, or direct from H.M. Stationery Office, 120, George Street, Edinburgh. The annual report was noticed in our columns of July 9th and 16th, and August 6th.

Letters, Notes, and Answers.

All communications in regard to editorial business should be addressed to ***The EDITOR, British Medical Journal, British Medical Association House, Tavistock Square, W.C.1.***

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the BRITISH MEDICAL JOURNAL alone unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the BRITISH MEDICAL JOURNAL must communicate with the Financial Secretary and Business Manager, British Medical Association House, Tavistock Square, W.C.1, on receipt of proofs.

All communications with reference to ADVERTISEMENTS, as well as orders for copies of the JOURNAL, should be addressed to the Financial Secretary and Business Manager.

The ***TELEPHONE NUMBERS*** of the British Medical Association and the BRITISH MEDICAL JOURNAL are *MUSEUM 9861, 9862, 9863,* and *9864* (internal exchange, four lines).

The ***TELEGRAPHIC ADDRESSES*** are:

EDITOR of the BRITISH MEDICAL JOURNAL, *Aitiology Westcent, London.*

FINANCIAL SECRETARY AND BUSINESS MANAGER (Advertisements, etc.), *Articulate Westcent, London.*

MEDICAL SECRETARY, *Mediocra Westcent, London.*

The address of the Irish Office of the British Medical Association is 16, South Frederick Street, Dublin (telegrams: *Bacillus, Dublin*; telephone: 4737 Dublin), and of the Scottish Office, 6, Drumsheugh Gardens, Edinburgh (telegrams: *Associate, Edinburgh*; telephone: 24361 Edinburgh).

QUERIES AND ANSWERS.

CANCER AND DIABETES.

"C. H. S." asks for experiences of the occurrence of carcinoma or other malignant disease in patients suffering from diabetes.

PETIT MAL.

"COUNTRY G.P." asks for references to recent literature regarding petit mal, and especially as to possible causation by toxic conditions.

INCOME TAX.

Liability of Colonial Medical Officer.

"J. J. B. E." is in the Colonial Service and visits the United Kingdom at intervals of from two to two and a half years, but never stays here six months in any one financial year. He has recently acquired the house in which his parents reside and would like to know to what end are directed some questions which he has received from the authorities as to his liability to income tax as a resident in this country.

*** Residence is a difficult question, which it is impossible to deal with adequately in a brief answer. The points on which the authorities are seeking information appear to be those which might establish that "J. J. B. E.'s" ownership of the house and the financial arrangements between himself and his parents are such that he has a place of abode in the United Kingdom to which he returns periodically to an extent sufficient to justify the inference that it is one of his places of residence. If that inference is correct then he would be liable to British income tax on that part of his earnings which he receives in this country.

Loss Due to Coal Strike.

"L. R." has been assessed for many years in respect of the earnings of a colliery practice. For the year to April, 1927, he has been assessed on the usual basis of the three previous years, but owing to the strike his expenses exceeded his gross earnings by £75. The inspector of taxes agreed to the deduction of the loss of £75 from the 1926-27 assessment, but says that otherwise it must stand.

*** That is in accordance with the law, which does not provide for an adjustment of the assessment in such circumstances unless the "average" period or part of it was during a predecessor's tenure of the practice. In fact, but for the change in the basis of assessment from the three years' average to the previous year, "L. R." would have been chargeable for 1927-28 on from £1,300 to £1,400. If "L. R.'s" earnings return to the former level he will not suffer loss in the long run, though obviously for the time being he has to bear the hardship of finding tax to meet a charge quite out of accord with his earnings for the actual year.

Arrears of Liability.

"J. C. G." paid tax in 1921, but has received no assessment since. How far back can the authorities now go, and can he claim an allowance for his housekeeper.

*** Assessments can now be made for the year commencing April 5th, 1921, and subsequent years. The housekeeper allowance can be claimed only in the special circumstances, looking after children, etc., set out in the notes accompanying the forms of return.

LETTERS, NOTES, ETC.

MENSTRUAL "UNCLEANLINESS."

DR. ROBERT HUTCHISON (London, W.) writes: I am grateful to your correspondents who have replied to the inquiry I made under the above heading. I have also received many private letters on the subject from doctors all over the country which show that the "superstition" referred to is very widespread amongst all classes, and there seems to be no doubt that it has its origin in a "taboo" which dates back long before Biblical times. Several correspondents have directed my attention to the paper by Macht and Lubin, to which Dr. Feldman refers, and which describes the results of the only attempt I have heard of to investigate the subject on scientific lines. I have not yet had time to study the paper myself, but I confess that it would require very strong evidence to convince me that the touch of a menstruating woman can excite decomposition in foods. Meanwhile, I would suggest that the subject is a suitable one for investigation by some of the women members of our profession, for the belief in this "uncleanliness" is evidently real enough to lead to a great deal of practical inconvenience.

BINOCULAR VISION.

DR. KENNETH R. SMITH, whose book on *Binocular Vision* was reviewed in our issue of September 24th (p. 552), writes to explain that his "exerciser for squint" is not intended to be used only with reading matter. He prefers an ordinary pack of cards, which are placed three in a row in the stand. The child sees the centre card with both eyes, the card on the left with one eye, and the one on the right with the other eye. He prefers playing cards to reading matter or pictures.

MINISTRY OF HEALTH REPORT ON SCARLET FEVER.

A Correction.

DR. ALLAN C. PARSONS, Ministry of Health, writes: I have to thank Dr. J. A. Milne for drawing attention to an error on page 9 of the recently issued report of the Ministry of Health on scarlet fever. Carbolic lotion 10 per cent. is there referred to, instead of carbolic oil, as it should have been written and is written on other pages which described the technique of the Milne treatment, as introduced by his father, the late Dr. Robert Milne.

A DISCLAIMER.

DR. A. J. D. CAMERON (Northampton) wishes to dissociate himself from any responsibility for an article in the *Westminster Gazette* of October 14th, headed "Rejuvenation by Fasting," in which his name was mentioned.

VACANCIES.

NOTIFICATIONS of offices vacant in universities, medical colleges, and of vacant resident and other appointments at hospitals, will be found at pages 35, 36, 37, 40, and 41 of our advertisement columns, and advertisements as to partnerships, assistantships, and locumtenencies at pages 38 and 39.

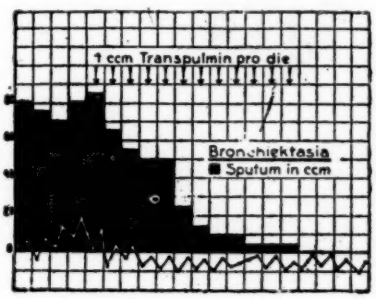
A short summary of vacant posts notified in the advertisement columns appears in the *Supplement* at page *179*.

THERAPIA NOVA

TRANSPULMIN „HOMBURG"

Indicationes:

Bronchitis acut. et chron., Bronchitis putrida, Bronchoblenorrhoea, Bronchiektasia, Bronchopneumonia, Pneumonia postoperat., Abscessus pulmonum, Gangraena pulmonum, Influenza etc.



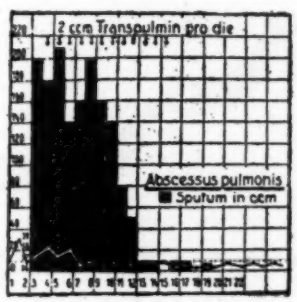
Deminutio sputi

1 ccm { 0,03 g Chinin.bas.anhydric. / 0,025 g Camphora in ol. aetheros. solut.

Dosis: pro die 1—3 ccm

Lag. orig. à 10 et 25 ccm

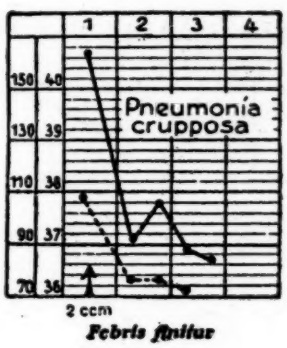
Scatulae originales:
Amp. VI et XII à 1,1 ccm
Amp. V et X à 2.2 ccm



Deminutio sputi

SOLVOCHIN „HOMBURG"

Indicationes: Pneumonia crupposa*)

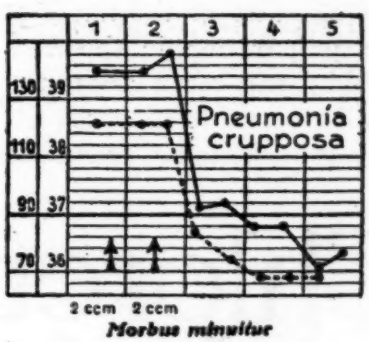


Febris finitur

2 ccm: 0,5 g Chinin.

Pro dosi et pro die: 2 ccm

Scatulae originales:
Amp. III et XII à 2,2 ccm



Morbus minuitur

*) Praeterea: ad accelerandum partum et abortum; ad curandam malariam.

INJECTIONES INTRAMUSCULARES

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IN CATARRHAL CONDITIONS

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P., D. & Co

Chloretone	1.0 gm.
Camphor	2.5 gm.
Menthol	2.5 gm.
Oil of Cinnamon, U.S.P.	0.25 gm.
Liquid Petrolatum	93.75 gm.

Supplied in bottles of 1, 4, or 16 fluid ounces.

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